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THE HISTORY OF MEDICAL JOURNALISM IN AUSTRALIA.[1]

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MEDICAL journalism in Australia may be said to have commenced in 1804, when Dr. Thomas Jamison wrote for public information an article on smallpox, which was published in the *Sydney Gazette* on Sunday, October 14, 1804. As this is the first recorded article on a medical subject written by an Australian medical man, and published in the public Press of Australia, it is worth quoting here *in extenso*.

An erroneous opinion in relation to the smallpox being generally received, and as an inference deduced therefrom equally fallacious with the principle upon which it is founded, I conceive it a duty incumbent on me as principal surgeon of this colony to remove prepossessions which, if adhered to, must be productive of the most calamitous consequences to the rising generation of these colonies.

First, it is conceived by a number of parents and others having the care of children that they have had the smallpox in a natural way; and secondly, that little danger is to be apprehended from its effects in this climate. In refutation of a conjecture fatal to be indulged, I must observe, the disease by some considered as the smallpox is no other than an eruptive appearance on the skin,

[1] This article is reprinted from the first number of THE MEDICAL JOURNAL OF AUSTRALIA, published on July 4, 1914.

proceeding from climate and other constitutional causes. Others may be deceived by the chicken-pox, an error that may be readily imbibed by those who are not conversant in the natural smallpox; for I most positively affirm, on my own personal knowledge for ten years past, that not a single instance of the latter disease has occurred in this country.

It is generally accredited by the medical gentlemen of the colony on its first establishment that the smallpox had been introduced among the natives by the crews of the French ships then lying in Botany Bay; but since that period no vestige of that disease has ever appeared.

In contradiction to so ridiculous an idea as that the natural smallpox should not carry with it, and be productive of effects baneful and destructive in the extreme. I have here to observe that in the Cape of Good Hope (the latitude being nearly the same with this place) the inhabitants dread the appearance of the smallpox as in other countries they do a plague, from the fatal malignity of its tendency and effects; and I have no doubt that should the disease ever visit this colony in a natural state, and particularly in the summer season, it would carry off nine-tenths of those who might receive the infection.

From the foregoing facts and circumstances I would earnestly recommend parents to avail themselves of the blessing held out to them by the provident care of the parent country by having their children inoculated with the vaccine or cow pock—an infallible preventative of that loathsome, disgusting, and too-often fatal disease when taken in the natural way.

It is almost needless to remark further on the particular virtues and properties of a discovery announced and recommended to the public notice, for the general benefit, from such high and indisputable authority; I shall only remark that the preventative qualities of the cow pock are incontrovertibly established; no preparatory regimen or extraordinary care are requisite in its application or progress; it is attended by no sort of danger or external blemish; wherefore should parents delay to embrace the salutary benefit now tendered gratuitously, and the vaccine infection be lost, the most distressing reprehensibility may accrue to them from their remissness in the preservation of their offspring, whose destruction hereafter may be reasonably apprehended to ensue from the smallpox should it ever visit this colony in a natural state.

There may have been other articles on medical subjects contributed by medical men to the public Press, but there was no attempt at the regular issue of a purely medical journal in Australia until the appearance in 1846 of the *Australian Medical Journal*. This was not the journal which now bears the same name, as it originated in Sydney. It was published at first by a syndicate, amongst whom was Dr. Isaac Aaron, who appears to have been the leading spirit throughout, and who, in May, 1847, assumed the complete control, as is indicated by the following extract:

May 1, 1847.—A change of proprietorship . . . and we have the gratification of stating that we are now "perfectly uncontrolled" and prepared to continue in the same honest and fearless course . . . Subscribers to the *Australian Medical Journal* are requested to take notice that no receipt for money will be valid unless signed by me.—Isaac Aaron.

This journal first appeared on August 1, 1846, and the last number was issued on October 1, 1847, the issue being a monthly one of 12 pages. Beyond occasional vigorous leading articles by Dr. Aaron as editor, it showed no noticeable characteristics, containing original articles, digests of articles appearing in other journals, and local news. There are recorded occasional quarrels between the medical men in Sydney, and reference is made to "bickerings and squabbles over the election of a physician to the Benevolent Asylum" (page 13). One statement is of interest: "One of our aristocracy refused, until threatened with the law, the moderate charge of £10 for travelling three times a hundred miles to relieve his sick overseer." *The Australian Medical Journal* acted as the official organ of the Port Phillip Medical Association, which was founded in 1847.

There is a copy of this journal in the Sydney Public Library. References to it will be found in the *New South Wales Medical Gazette* as follows:

Some twenty years ago an attempt was made by a member of the profession, since deceased, to establish a medical journal in this colony. It is unnecessary now to enter into details respecting this publication and its want of success. It was probably premature. At all events, after an existence of twelve months, entailing considerable pecuniary loss on its then proprietor, it died of inanition. It was not supported by the profession as it was hoped it would be. [*New South Wales Medical Gazette*, 1870, page 14.]

We have lately had the opportunity of reading the *Australian Medical Journal*, published in 1846, printed by Mr. William Baker, and edited by I. Aaron, M.R.C.S. As an aid to the history of the profession and the progress of medical and surgical knowledge in the colony, this periodical is most useful, and we regret to hear that it is now out of print. [*New South Wales Medical Gazette*, 1872, page 120.]

The next journal to be established carried the same name, *The Australian Medical Journal*, but was published in Melbourne. This journal was established by the Medical Society of Victoria, which elected the editors and managing committee. First published in January, 1854, it has continued in existence under different titles for 54 years, ceasing only in order to be merged, for greater usefulness, into the federated Australian publication, of which this present is the first number. This *Australian Medical Journal* began as a quarterly issue; in 1864 it was issued monthly, and continued as a monthly publication until July, 1911, when it was converted into a weekly journal. It has been always the official organ of the Victorian Branch of the British Medical Association, and has been officially published by that Branch. In 1896 the journal was amalgamated with the *Intercolonial Quarterly Journal of Medicine and Surgery*, and the title was altered to the *Intercolonial Medical Journal of Australasia*. This title was again altered in January, 1910, to the original title of *Australian Medical Journal*, the editorial note on the change being as follows:

For a long time past it has been evident that this title is not only cumbrous, but incorrect. Since the establishment of federation the word "colony" has ceased to be applicable to the territorial units of the Commonwealth, and the term "Australasia" has no administrative existence. The colonies of aforetime have become united as States forming a Commonwealth of Australia. We therefore propose that, beginning with the January issue of 1910, the journal shall revert to its old designation of the *Australian Medical Journal*, and ask all concerned to take note of the present intimation.

The list of editors of this journal includes the names of some of the most respected members of

the medical profession in Victoria. Doctors Maund and Black were the first editors; Dr. Wm. Thomson was editor from 1859 to 1861, and he was succeeded by Dr. J. Neild, who directed the course of this journal through the most stormy period that has been known in the medical politics of Victoria. Dr. Neild remained editor for seventeen years, from 1861 to 1878, and was succeeded in turn by Professor (now Sir Harry) Allen, Doctors Jamieson, Moore, Syme, Stawell, Wilkinson, Lewers, and A. J. Wood.

Victoria produced the third in the series, namely, the *Medical Record of Australia*, which appeared first on May 1, 1861, and continued to appear until December, 1863. This journal was issued twice monthly, and was edited by Dr. C. E. Reeves. It consisted largely of extracts from current medical literature, together with local topics of more or less interest. The original articles were almost entirely from the pen of the editor himself and Mr. J. G. Beaney—the latter a well-known member of the medical profession of the period. The difficulty in obtaining contributions is expressed by the editor in the issue of September 2, 1861 (the ninth number in succession of issue), and this difficulty was such as to necessitate a reduction in the frequency of issue from fortnightly to monthly. A feature of the last two years of publication was a series of articles by the editor on "Diseases of Australia". These articles give evidence of careful preparation, but the material is mostly speculative rather than exact.

At the beginning of the second half-year of issue the editor remarks as follows:

> The Editor has much pleasure in laying before the profession the first volume of the *Medical Record*. . . . He would have wished to increase the size of the journal next year, but the high rate of wages renders this impossible. He wishes it to be understood that he has not started the journal as a commercial speculation. [1862, page 145.]

From this it appears that the journal was a private venture. The pride the editor felt is expressed in the "Address" in the last number of the second volume:

> The Editor has much pleasure in laying before the profession the second volume of the *Medical Record*. It will, he feels assured, be a source of pleasure to those who take an interest in the advancement of medical and surgical science in the colony to learn that nearly all the articles which have appeared in the journal have been reprinted in the European journals. [1862, page 133.]

This journal, being a private venture, and therefore dependent on the exertions of one individual, naturally came to an end when the individual was incapacitated. The following note announces the conclusion of the venture:

> Dr. Reeves begs to state that this will be the last number of the journal that he will publish. The state of his health renders it necessary that he should discontinue mental labour for a time. [1863, page 138.]

After an interval of twelve years, however, this journal reappeared, the name being slightly changed, and it became the *Melbourne Medical Record*, the first number of which appeared on February 27, 1875, this number being known as No. 1, Vol. 4. It was published weekly until October, 1875, when it commenced to appear fortnightly. No. 5 of Vol. VII is the last number of which there is any record. The publisher was R. T. Clarke, of Fitzroy, Melbourne.

Another medical journal launched about the same time was the *Medical and Surgical Review—Australasian*. This was published in Melbourne by F. F. Baillière, but the copies available contain no internal evidence to indicate either the identity of the editor or the society or body which promoted it. It appeared on October 1, 1873, and was published monthly until April, 1875, and consisted largely of articles and memoranda on clinical subjects. Mr. J. G. Beaney appears to have been associated, as a frequent contributor, with this venture. The last reference to this journal that can be found is a mention of its title amongst the list of exchanges of the *New South Wales Medical Gazette*, in July, 1874.

A journal having almost the same name, *viz.*, the *Australasian Medical and Surgical Review*, was published in 1863, the first number being issued in March of that year, and the last in January, 1864. This short-lived journal appeared monthly, being published by Messrs. Ferguson and Moore, of Melbourne. There is nothing in its pages to indicate who was responsible for its appearance, and as it does not refer to any society or public body, it may be presumed that it was a private venture. The only copy the present writer has seen bears the autograph of Dr. C. E. Reeves, and, in view of Dr. Reeves's known activity in the direction of medical journalism, the suspicion that he may have been the author of this periodical also is justified.

In 1869 there was considerable strife within the ranks of the medical profession in Melbourne, and the profession had been divided into two camps—the Medical Society of Victoria and the Medical Association of Victoria. The former continued the publication of its official organ, the *Australian Medical Journal*, and the latter, in 1869, established its own journal, the *Australian Medical Gazette*. The centre of the conflict between the two bodies was the office of coroner, and the gentleman (Dr. Youl) who held that position. The latter journal was purely medico-political in origin, and strongly so in character, and its policy appeared to consist largely of attacks on Professor Halford and Dr. Youl, the professor of pathology and the city coroner respectively. It first appeared on January 30, 1869, and is known to have been published until December, 1871, as a monthly publication throughout. There is no internal evidence of the identity of the editor, but Dr. C. E. Reeves, who owned and edited the *Medical Record*, was a frequent contributor. No copies of this journal subsequent to 1871 are known, but it is mentioned in the April number of the *New South Wales Medical Gazette* of 1872 amongst the list of exchanges, probably because it was received too late to be mentioned in the December number. The *Intercolonial Medical*

Journal, in 1906, states that it was published "for four years", but it is thought that this must be a mistake.

The second journal to be published in New South Wales was the *New South Wales Medical Gazette*. This appeared in October, 1870, and was then managed and owned by the medical officers of the Volunteer Force, and was edited by three of their number. Subsequently, in October, 1871, both the ownership and the editorship passed into the hands of Dr. Frederick Milford, who had been one of the three original editors. In March, 1875, a new editor was appointed—Dr. Samuel T. Knaggs. This was a strong and vigorous journal, full of interesting and stimulating articles, and it bears strong evidence of having been excellently managed. It had, however, only a brief existence, and its disappearance is somewhat unkindly chronicled by the *Australian Medical Journal* of 1876 (page 324) as follows:

> It is only recently that the *Medical Gazette* in New South Wales, which had struggled with difficulties for four years, finally yielded to what seemed to be its fate.

It was published monthly until September, 1875, each number containing 32 pages.

The direct successor of the *New South Wales Medical Gazette* was the *Australian Practitioner*. This was entirely a private venture, the editor and proprietor being Dr. Samuel T. Knaggs, who had been associated as editor with the *New South Wales Gazette*. Dr. Knaggs issued the first number of the *Australian Practitioner* in October, 1877, and it appeared thereafter monthly until October, 1878, when it ceased. The difficulties attending the issue of a medical journal as a private speculation formed the reason for the cessation of this one. Dr. Knaggs records that a specimen copy of the first number of the journal was forwarded free of charge to every medical practitioner in the Australian colonies, and of each subsequent issue 300 copies were gratuitously distributed amongst professional non-subscribers. Notwithstanding all this advertisement the balance sheet for the first year showed that the expenses for the first year amounted to £122 and the receipts were £21, of which £13 was made up by subscriptions and £7 10s. by advertisements.

This journal was the nearest approach to a public health journal that has been issued in Australia.

In the last number of this journal appears a strong plea for some form of federation between the New South Wales and Victorian Medical Societies.

In 1881 the *Australasian Medical Gazette* was commenced in Sydney, the first number being issued in October. This was published as the official organ of the Victorian, South Australian and New South Wales Branches of the British Medical Association. It owed its origin to the enterprise of Mr. Ludwig Bruck, the well-known medical agent in Sydney, who conducted it as a private venture from its commencement until 1894, when the New South Wales Branch of the British Medical Association purchased it from him. The issue of January, 1895, was the first under the new proprietorship, and the letter from the secretary of the Association, which appears in that number, conveyed a well-deserved tribute to the energy of Mr. Bruck and to his service to the profession in maintaining this journal.

The *Gazette* has been the official organ of all the Branches of the British Medical Association in Australia, except the Victorian, since that time, and has been probably the most successful journal which has hitherto been issued in Australia. The editors have been in succession Dr. F. Milford, the Honourable J. Mildred Creed, M.L.C., Dr. Samuel T. Knaggs, and Dr. G. E. Rennie, while Dr. Cleland acted as assistant editor since 1911, when the publication became weekly.

The *Gazette*, like its contemporary, the *Australian Medical Journal*, ceases only in order to be incorporated into the new Australian journal.

In 1894 the *Intercolonial Quarterly Journal of Medicine and Surgery* was commenced in Melbourne. The origin of this journal can be traced to a resolution carried at the Intercolonial Medical Congress, held at Sydney in 1892, which was as follows: "That it is desirable to found an Australian Medical Journal." A movement was started in Melbourne to give effect to the desire thus expressed, and this quarterly was commenced. It contained original articles, and was fairly successful during its first year of issue. In 1896, however, it was decided to amalgamate this journal with the *Australian Medical Journal*, and the combined periodical was known as the *Intercolonial Medical Journal of Australia*.

Finally mention must be made of a journal which had a very brief existence, appearing for only three monthly numbers. *The Journal of the Sanitary Inspectors' Association of Western Australia* appeared first in March, 1908, and ceased with the May number of the same year.

The following is a tabulated statement of the medical journals published in Australia:

1. *Australian Medical Journal*, New South Wales 1846-1847
2. *Australian Medical Journal*, Victoria, afterwards *Intercolonial Medical Journal*, afterwards *Australian Medical Journal* 1856-1914
3. *Medical Record of Australia*, Victoria 1861-1863
4. *Medical and Surgical Review*— Australasian .. .. 1863-1864 Victorian 1873-1875
5. *Australian Medical Gazette*, Victoria 1869-1871
6. *New South Wales Medical Gazette*, New South Wales 1870-1875
7. *Australian Practitioner*, New South Wales .. 1877-1878
8. *Australasian Medical Gazette*, New South Wales 1881-1914
9. *Intercolonial Quarterly Journal of Medicine and Surgery*, Victoria 1894-1896
10. *Journal of the Sanitary Inspectors' Association of Western Australia* 1908

New South Wales produced four and Victoria five of the Australian medical periodicals. It is

interesting to note that medical journalism in Australia owes much to two members of the profession, Dr. Samuel T. Knaggs being financially interested in and the moving spirit of the *New South Wales Medical Gazette*, the *Australian Practitioner* and also for several years editor of the *Australasian Medical Gazette*; and Dr. C. E. Reeves, who was equally associated with the *Medical Record*, *Australian Medical Gazette*, and possibly also the *Medical and Surgical Review*.

The publication of articles of medical interest, however, has not been confined to purely medical journals. The published proceedings of the Royal Society in each of the States have contained many articles on many medical subjects. So early as 1858 the *Sydney Magazine of Science and Art* contained a number of articles on medical subjects, more particularly in the sphere of public health. The *Transactions of the Intercolonial Medical Congresses*, commencing in 1887, contain a large amount of valuable medical literature. The daily public Press also has throughout the whole period of Australian journalism contained many contributions on medical subjects.

THE CHANGED OUTLOOK IN MEDICINE DURING THE LAST TWENTY-FIVE YEARS.

By SIR CHARLES BICKERTON BLACKBURN, M.D., F.R.C.P., F.R.A.C.P.,

President of the Royal Australasian College of Physicians.

IT would be impossible to convey any satisfactory appreciation of the changed outlook in medicine during the past twenty-five years without taking into account some at least of the important factors that have contributed to its evolution. It would, however, be both futile and tedious to attempt to set out the stages in any close chronological order. Indeed even in the limited field of scientific discovery it is doubtful if any really adequate time-table could be compiled, since each accession to knowledge of one aspect of the human organism inevitably influences our understanding of others.

The date of the first publication of THE MEDICAL JOURNAL OF AUSTRALIA—1914—does, however, offer an irresistible invitation to deal separately with the war and post-war periods.

When we recall the tragic toll that medicine paid, it seems almost heartless even to suggest that it made any progress during the War. Yet when we take a broader and more dispassionate view, we realize that, so far from its being a barren period, it was during the War that the foundations were laid for much of the progress that has since been made. Somewhat paradoxically it might be said that this was largely the result of the very magnitude of the War itself, for the great influx of civilian physicians into the army medical corps not only led to a more scientific study of the diseases met with than in any previous campaign, but had a profound influence in modifying medical practice after demobilization.

The appearance on different fronts of the various epidemics associated with military campaigns gave opportunity for skilled observation on a large scale of cerebro-spinal fever, the dysenteries, malaria, cholera and typhus, and valuable data were collected that have been the basis of great subsequent advances in our knowledge of epidemiology, while the great value of the prophylactic use of tetanus antiserum and "T.A.B." injections was firmly established.

The new type of warfare, entailing the sharing of damp insanitary trenches with rodents for prolonged periods led to the appearance of new types of disease—trench fever and trench nephritis—while spirochætal jaundice, hitherto a comparatively rare disease, became alarmingly common. Towards the close of the War another new disease epidemic, encephalitis, appearing in the wake of the influenza pandemic, focused attention on the virus diseases, while the study of its common sequel, post-encephalitic Parkinsonism, has paved the way to a better understanding of the extrapyramidal system.

Experiments in feeding animals during the War led to the discovery that the exclusion of different foodstuffs from otherwise adequate diets produced different types of disease, whereas the addition of quite small amounts of these foods maintained them in good health. The obvious significance of these findings as an explanation of the appearance of rickets, pellagra, scurvy, beri-beri and hunger œdema, particularly among the under-nourished population of central Europe and Asia Minor, gave a great impetus to the post-war investigation of nutritional diseases and led up to our present-day appreciation of the accessory food factors and their ultimate identification under the modern term vitamins.

Even the diabolical use of poison gas on the field had an indirect value in stimulating research for the necessity of combating these chemical poisons, as also trinitrotoluine poisoning among munition

workers led to a greatly enhanced interest in industrial medicine, and thus ultimately to the saving of the lives of many exposed to industrial hazards.

Similarly, post-war medicine owes much to the fact that urgent necessity led blood grouping and blood transfusion to become routine procedures in the surgical units behind the lines.

Again, the present-day appreciation of the importance of the psychological factor in disease is in great measure due to the study of the war neuroses and the recognition of how readily under conditions of mental stress and physical exhaustion a quite minor infection or trauma is capable of precipitating a profound psychic breakdown. Incidentally, cardiology owes much to the interest taken by Sir Thomas Lewis in one type of neurosis, the soldier's heart.

While the exigencies of military duties and of attending to the immediate needs of the sick rendered it impossible for most medical officers to do more than play the part of skilled observers, a certain amount of valuable research was carried on behind the lines. It is of special interest to recall that it was while he was carrying out the duties of pathologist to a two-thousand bed hospital that an Australian, Hamilton Fairley, conducted his notable researches in bilharziasis.

Apart altogether from the results of this large scale observation of disease, the outlook in post-war medicine was destined to be profoundly altered by the recruitment of so many civilian practitioners to military service. What took place was virtually a period of intense post-graduate study, in which seniors and juniors, as it were, went back to study together and worked for the common good and incidentally their own.

It was therefore not surprising that the young doctor who reentered civilian practice at the conclusion of the War had undergone a remarkable metamorphosis since his enlistment. Mentally matured beyond his years by the dangers and horrors through which he had passed, his experience had equipped him with a measure of judgement and knowledge such as he might never have attained in a lifetime of general practice.

In Australia in particular the quality of service rendered by returned men has exercised a profound influence in raising the standard of medical practice, most obviously of course in country districts. Indeed there can be little doubt that the improvement in medical service that has resulted from the great increase in the number and improved quality of hospitals outside the metropolitan areas today is largely due to the refusal of these men to acquiesce in the lack of facilities tolerated by their predecessors.

The conclusion of the War was immediately followed by a widespread interest in research that has no parallel in the history of medicine and has achieved results that have in many respects entirely altered our viewpoint towards disease. To this the War undoubtedly contributed, not only as has already been said, by providing new problems for solution and exposing new angles of approach, but by making available so many young men with the enthusiasm and mental equipment needed for the work.

In the extraordinary advances in our knowledge that have so rapidly followed, the leading part has without question been played by the ancillary sciences, the cooption of which to the solution of problems previously regarded as of purely medical interest has been the most striking characteristic of the new era. Thus the employment of the physiological and biochemical approach has led to the picking of many locks for which clinical and pathological keys had long been vainly sought, and in doing so has given access to vast and often entirely unsuspected further fields of investigation.

The story, one might say romance, of how these sciences have steadily and surely unravelled the most intimate secrets of cellular activity will be told elsewhere. What chiefly affects the present viewpoint is that the recognition that the adjustments of the human organism to its environment are carried out or at least mediated on a chemical basis, has caused such a complete reorientation of our outlook that we find ourselves paying far less attention to the nature of the attack than to the reasons why it is not resisted.

The adoption of a deficiency complex as the spearhead of attack on problems of ill health—concentrating on the *minus* instead of the *plus*—has already yielded spectacular results, though naturally these have been most notable in increasing the accuracy of diagnosis, since obviously flaws must be detected before they are corrected.

While it would be hopeless to attempt any general survey of diagnostic progress, a slight hint of its extent may be gleaned by recalling the ease with which we can now accurately detect numerous defects in metabolism, nutrition and endocrine activity that were not even known to exist a few years ago. Other tests inform us whether the various organs are discharging their normal functions, and if not, where the fault lies. Indeed, we have even had to abandon our conception of an organ as a compact localized structure and accustom ourselves to include in the definition structures widespread through the body with no continuity other than purpose, such as the reticulo-endothelial system and the erythron.

While advances in treatment must, as has been said, inevitably lag behind those in diagnosis, there are already many notable examples in which the correction of deficiencies has enabled us to control disorders that had resisted the therapeutic measures of our predecessors. As examples may be quoted *diabetes mellitus*, pernicious anæmia, pellagra, peripheral neuritis, rickets and menopausal disorders.

Reference must also be made to the far-reaching changes that have resulted from the new status

that research itself has come to occupy in the functions of a medical school. In June, 1914, research carried on in departments of a medical school was still liable to be regarded rather in the light of a secret vice, to which a professor's occupation rendered him peculiarly susceptible, and which might well be looked at with a blind eye, provided it was only indulged in in his spare time and did not interfere with his teaching activities. In the brief span of years since then, however, the position has so completely changed that his former amiable hobby is fast becoming regarded as the professor's preoccupation. A position is developing in which the status of a university will be judged mainly on the basis of its willingness and ability to provide not only an adequate staff to relieve its professors of their teaching responsibilities, but also the technical assistance needed to further their researches. This new development, covering as it does the whole period of his training, keeps the undergraduate of today continuously in an atmosphere of research and introduces a bias towards the scientific approach in his professional activities that was not presented to his predecessors. Many are inspired by their interest in the work they see going on around them to try to make some contribution of their own to science, with the result that quite a number of useful investigations are carried out by young graduates before they settle down to practice.

In general it may be said of the young graduate of today, as compared with those of twenty-five years ago, that the scientific trend of his training and his familiarity with the use of modern ancillary methods of diagnosis have made him more alert, more ambitious, more eager to serve on hospital staffs, and generally more alive to the fact that rapid changes are taking place and more determined to keep up with them. Here in Australia the new outlook finds expression particularly in the enhanced demand for better organized facilities for post-graduate study and an increasing tendency to obtain higher qualifications.

The advances in psychological knowledge that have followed post-war research have been scarcely less revolutionary than those contributed by the physical sciences. The term psychoanalysis has become so linked in the public mind with its concept of modern psychology that any reference to progress in this science inevitably conjures up the idea of the application of a new analytical method to the solution of those problems of the psychic misfits that have long been the despair of the physician. Actually, of course, this is but one limited application of a new psychological outlook that visualizes the psyche as dominating personality and behaviour throughout life and thus a far more significant factor in disease than hitherto suspected. With our increasing appreciation of how frequently illnesses seemingly physical have a purely psychical origin and that even in actual physical disorders there is always some measure of psychic background, the accurate assessment of which may play a determining part in the treatment, it has become evident that a knowledge of psychology can no longer be the prerogative of a chosen few. Clearly the every-day practitioner must once more play his traditional role of priest-physician, and his education must be adapted to render him no less competent to deal with the psychological than with the physical need of his patients.

Unfortunately it is not easy to present this viewpoint adequately to the undergraduate during his clinical training, where his medical experience and teaching concern themselves almost exclusively with patients whose ailments are predominantly physical. The change that has been made in the curriculum to meet this deficiency by the establishment of psychiatric clinics in the medical schools has undoubtedly been a move in the right direction. It has, however, the inherent defect that since patients are rarely referred to these departments till the symptom complex is obviously psychical, there is little opportunity for demonstrating the type of minor psychic maladjustment that underlies so much of the sickness met with in general practice. Moreover, the very fact of finding them in separate departments tends rather to rivet the student's attention on the distinctive features in the physical and psychical aspects of disease than to develop his much-needed appreciation of their intimate relationship.

Space will not permit of reference to the many other fields of scientific progress, but passing reference may be made to our improved understanding of cardiac disorders, if only because the constantly changing viewpoint is so well illustrated by the fact that to the electrocardiograph, the Röntgen rays and the kymograph, which would a year ago have shared the credit of contributing to our knowledge, we have now to add the anatomical researches that have so greatly added to our understanding of the architecture of the myocardium.

Of very material interest to the practitioner is the much greater time needed to conduct an individual examination under modern conditions of practice. Very frequently the thorough examination by the unaided senses that not long since was the complete basis of diagnosis, is now but the first stage in the consultation, introductory to the careful consideration of whether recourse should be had to one or more of the available special methods of investigation—pathological, instrumental, radiological, biochemical *et cetera*. In the event of an affirmative decision, letters have to be written setting out the requirements and the completion of the consultation postponed till the reports are available. As he can but rarely look for any added remuneration to recompense him for this extra time, the doctor finds that his income tends to diminish as his efficiency increases—a situation that has led to some striking readjustments in various types of medical practice.

Thus the modern young graduate feels that he would but prostitute his art if he attempted to undertake the charge of the large friendly society practices in vogue twenty-five years ago. Yet despite

perennial complaints about the inadequacy of the pay, he as gladly accepts a limited list of these patients as he would an honorary appointment to a public hospital. He sees in the payment offered for his services a secure, if small, foundation of an early precarious income, and hopes that while his private practice is limited, the entirely disproportionate share of his time demanded by faithful service to his lodge patients will be requited by the increased efficiency attained. He little realizes how much that efficiency will depend upon his capacity to develop the sympathy and human understanding that were the standby of the rather despised family practitioner whom he has replaced and that supplied not only one of his few reliable diagnostic tests, but also the wrappers that activated his bottles of medicine.

In public hospitals where services are rendered in an honorary capacity, the situation has been admirably met by the development of the unit system, in which representatives of the various branches of medicine work harmoniously together as a team—a system that was first instituted in military hospitals during the War.

The success of the hospital units has led to the introduction of a somewhat analogous system in private practice, giving rise to the private clinic which receives patients for investigation, the clinic consisting of groups of specialists and the patient often paying a composite fee to cover all services.

While well-managed clinics of this type are unquestionably rendering valuable service, there is some doubt as to whether a high standard is invariably maintained. Unless there is at the head a very sane well-trained physician, prepared himself to advise whether anything more than a general clinical examination is really needed, many who are unhappy rather than ill may fail to be discouraged from spending hard-earned family savings on unnecessary investigations—what Dr. F. M. R. Walsh recently so aptly described as "merely recondite explorations of the irrelevant".

THE CHANGED OUTLOOK IN SURGERY.

By SIR HENRY NEWLAND, C.B.E., D.S.O., F.R.C.S., F.R.A.C.S.,

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IN his address on "Surgery and Devolution", Sir Lenthal Cheatle insists that the leaders of surgery, if they are to lead, must always have before them the ideal of investigation. "Leadership involves work on something more than mere technique. The surgical leader must be a thinker and investigator. One who is only a clinical surgeon and nothing more cannot hold a position as a leader in his profession. As the unsolved problems of surgery multiply as time goes forward there will always be need for the investigator." As bearing on this theme, and in the attempt to portray the changing outlook of surgery, it is of interest to recall some observations made by two distinguished British surgeons not long before the foundation of this journal. In January, 1911, a month before the death of the immortal Lister, Victor Horsley in returning thanks after he had been awarded the first Lannelongue Prize said that his own country which had long been under the influence of John Hunter had later come under the influence of Claude Bernard, who had joined together physiology and surgery. "That is what I have striven to realize. Unfortunately if surgical science advances with fair rapidity, its practice progresses slowly. That is because we are held in bondage by traditions from which we have difficulty in freeing ourselves." Horsley was alluding to the supposed dependence of surgery on anatomy, when he himself clearly saw that it is upon physiology that it must in future depend or only on anatomy as mechanical considerations may consider necessary. Horsley's graceful compliment to Claude Bernard and the French nation might with equal justice have been applied to his own countryman, Lister, who was essentially and fundamentally a physiologist. Long before he acquired fame as a surgeon he was an experimental physiologist and he continued to be one throughout his career. Some of his earlier observations on inflammation were made under Wharton Jones, another physiological surgeon, whose excessive modesty prompted the Osler's witticism that "his life was one perennial blush". Had Lister not been in the first place a physiologist, it may be doubted whether he would have lighted upon antiseptic surgery. It should be a stimulus to the surgeons of today and the future to bear in mind that Lister's most important contribution to physiology was made when his time was very fully occupied with surgical work and teaching. Its subject, the cause of coagulation of the blood, is still of the greatest interest and the subject of research. This property of blood is ever the greatest bugbear of transfusion, notwithstanding the efficacy of sodium citrate *in vitro* and of "Heparin" when injected into the blood stream of the donor prior to the withdrawal of his blood.

Lister and his disciple Hamilton Russell also realized that surgery, if it is to be regarded as a science, can only advance by the aid of experiment. "This does not mean that the experiments of the modern surgeon must be conducted in a laboratory

only. Lister's were made with test tubes, animals and patients. With reference to his work on catgut ligatures, he said that if he had not been able to experiment on animals he would have had to do so on his patients or on man. He transformed surgery from a mere art into a real science which could only be properly advanced by those who adopt scientific methods." The Royal Australasian College of Surgeons recognizes that the practice of the art only is not enough. The President in the ritual of admitting successful candidates to the Fellowship expresses the hope that in addition to practising the art they will help to advance the science of surgery. "Surgery and physiology are mutually dependent. Physiology must call in the aid of surgery to solve many of its most intricate problems and surgery cannot make any real advance unless it proceeds hand in hand with physiology" (Schafer). Horsley began surgical practice when the importance of animal experiments as a guide to surgery was beginning to be appreciated. This tendency was especially apparent in two directions, namely, the investigation of the functions of the brain and of the endocrine organs. Among the latter, the thyreoid and the pituitary gland engaged Horsley's attention. At the present time, more than fifty years since he embarked on his experiments, the brain and these two glands offer a fruitful field for research to the surgeon for whom it has any attraction. The treatment of all forms of toxic goitre at the present time is, in the last resort, extirpatory. Although the administration of iodine prior to operation has of late years robbed the procedure of most of its risk, it is disconcerting to reflect how many tons of thyreoid tissue are annually cast into the rubbish destructors of the hospitals of the world. Technically thyreoidectomy is one of the triumphs of modern surgery. From a therapeutic point of view, however, it is a reproach to preventive surgery. Further light is thrown on the outlook of surgery in 1914 by that acute observer Bland Sutton, who as anatomist and biologist followed the tradition founded by John Hunter. In his address on "The Surgeon of the Future" he warns the casual and too self-confident surgeon (not yet extinct) that the records of surgical procedures always contain a mortality bill for even the most trifling operation. He prophesies that "soldiers and surgeons will be required as long as civilization endures". He deplores the fact that surgeons no longer act as demonstrators of anatomy (in which he himself was steeped) or conduct *post mortem* examinations' "for they learn something they cannot learn from books, the appreciation of tissues". By this he meant the power to recognize organs and tissues, normal and abnormal, at sight or by touch in the course of an operation. Surgeons, he says, are of two types, "they are either craftsmen or biologists. The surgical craftsman invents variations in technique—metal plates, wires and screws for bones". His outlook is governed by physics rather than by physiology. Bland Sutton does not deprecate such activities, for he goes on to say that "the utility of a simple tool like the clip forceps is inestimable". It should not be lost sight of that animal experiment may throw a flood of light on the effect of a surgical mechanical agent on anatomical structure. Several decades before Lister, J. F. D. Jones had discovered by experiment on animals that the only safe and sure method of tying an artery was to apply a small ligature with sufficient force to divide the inner and middle coats. Bland Sutton agrees that clever contrivances which have gained acceptance like the ophthalmoscope, laryngoscope, bronchoscope and cystoscope and others have revolutionized special branches of surgery. He is not so certain that the average surgical capacity can deal with the œsophagoscope. "For its successful use the œsophagoscope requires a surgeon with the instincts of a sword swallower and the eye of a hawk." The modern surgeon no longer regards the passage and use of the œsophagoscope as demanding almost superhuman attributes; indeed wonder at the use of the gastroscope is ceasing to grow.

Pursuing his theme, Bland Sutton says: "The biological surgeon studies pathology in its broadest aspect and investigates in the laboratory problems of morbid anatomy and bacteriology." The culture of tissues has added to the pathological resources of the neuro-surgeon. The diagnostic value of reports issued from the laboratory by the pathologist and bacteriologist must be estimated with the help of clinical experience. Personal contact is, however, better than impersonal reports on paper and in some surgical centres this is being more and more realized. "It requires a little foresight in Bland Sutton's view to recognize that for men ambitious to attain high places in surgery the high road lies through the pathological institute, and that the future rests with bacteriologists, experimental physiologists, physiological chemists and physicists. From this union of workers means will be found for the cure of diseased organs by chemotherapy rather than by their extirpation. Pending the discovery of the means, chemotherapeutic or otherwise, surgery must hold the field. The skill, ability and dexterity of surgeons are, however, greatly handicapped by the presence in many of the organs and tissues of streptococci and the coli group. To destroy these, therapeutic agents are needed which will destroy parasites without killing the tissues of the host." The recent use of the sulphonamide group in a bacteriological assault on the streptococci, meningococci, pneumococci and others has been an advance in the direction indicated by Bland Sutton. As was the case with "Salvarsan", the powerful virtues claimed at first for the sulphonamide group seem to have been over-estimated. The discovery to say the least heralds the dawn of a brighter day. Bland Sutton foretold that the surgeon of the future will be able to prevent many of those complications which militate so greatly against the success of operation. He could hardly have foreseen the immense influence the discovery of insulin has had on the prognosis of operations on the diabetic. The conquest of diabetic coma is in sight. The average age at death

among the diabetics in Boston in 1935 was 64·3 and females constituted two-thirds of the whole number. Arteriosclerosis was the cause of death in 60%. These figures clearly indicate the shift in the mortality rate from the young to the old and from coma to arteriosclerosis as the immediate cause of death since the advent of insulin. The treatment of surgical conditions in the diabetic has been revolutionized and made safe.

Passing to diagnosis, Bland Sutton prophesies that diagnosis will be made more sure by the assistance of methods as yet undreamed of. Here, too, the prophecy has come true. Visual evidence of disease derived from the injection of air and opaque chemical substances, in association with the use of X rays, has been of incalculable advantage to the surgeon and led to conjecture giving place to certainty. By these means the localization of lesions of the brain and spinal cord has reached such a degree of accuracy that the surgeon is enabled to operate at a much earlier stage than used to be the case. Arteriography, too, has proved to be of great value in determining the site of tumours of the brain and in ascertaining the presence and sufficiency of collateral circulation in vascular lesions of the limbs. The use of lipiodol in the diagnosis of diseases of the lungs and bronchi, of pyelography excretion and retrograde, and of cholecystography all afford means for exactness in diagnosis unheard of twenty-five years ago. Mr. Norman Lake has observed that the operating lists of a quarter of a century ago were characterized by the large number of "exploratory laparotomies", whereas nowadays he notes that the disease and nature of the operation are usually exactly stated. "Perhaps", he says, "we should credit the previous generation with a greater modesty in diagnosis and the assurance of the present day may be a mere characteristic of the age, but for my own part I feel convinced that there has been a very real change which cannot be explained away in this glib fashion. There are today fewer gross mistakes in diagnosis and many less cases submitted to unjustifiable or futile operations. From the surgeon's point of view, 'seeing is believing', and it is of some philosophic interest to note that practically all the modern aids to diagnosis are means of rendering changes obvious to that most accurate of all senses, vision." All the various X ray examinations applied to the organs have as their main object the production of shadowgrams. It is well in the interpretation of them to remember "what shadows we are and what shadows we pursue". Despite all the modern aids, however, Lake's conclusion is, and with it most surgeons will agree, that there appears to be no golden road to diagnosis, and the acumen of the clinician, although applied in newer ways, is as needful today as it was in a previous generation and as it undoubtedly will be in future generations. In their application to the elucidation of disease there is no fundamental difference between the test meal, the manometer for the estimation of pressure of the cerebro-spinal fluid and that extremely delicate and sensitive instrument the clinical thermometer.

The advent of the Great War provided a gigantic stage for the observation of gunshot wounds and their complications. The experience then gained has with great advantage since been applied to surgery in civil life. Tetanus which was rife during the first two months of the War ceased with almost dramatic suddenness with the timely administration of the antitoxin to all wounded. It was soon realized that a recent contaminated wound was not at first an infected wound, and that pyogenic infection could be prevented by efficient excision of the contaminated tissues. It was only towards the end of the War that surgeons dared to suture immediately or after a short delay wounds treated in this way. Prior to the evolution of this method of treatment trust had been placed in antiseptics, drainage, hypertonic saline solution and secondary suture. Gas gangrene, an infection that vied with tetanus in its lethal effects, was curbed, where excision had failed, by sero-therapy. The War had a great influence in developing thoracic surgery and the plastic surgery of the face. It stimulated the surgery of the bones and nerves, and the whole subject of orthopædics. The employment of blood transfusion today is the direct result of its common and organized use in the treatment of hæmorrhage and shock during the War.

The chief advances in the War were in connexion with the art of surgery. The War had a great effect on the surgeon's attitude to his work. He was taught his personal limitations and the necessity for team work. This need is now recognized in civil surgery, although there is still far less intimate collaboration than there should be. "Working by himself the surgeon must fall short of possibilities. If he is to do the best possible for his patients he must accept and confer with and take guidance from others who are experts in their specialty.". The necessity for team work has arisen because of the great development of specialization. Sir Arthur Keith in his oration on "The Inexorability of the Law of Evolution as Manifested in Modern Medicine" points out that Herbert Spencer's law of progress is merely another name for increased specialization. How rife specialization is may be realized in a stroll down Macquarie or Collins Street and from the fact that the Royal Society of Medicine has found it necessary to divide its Proceedings into twenty-four sections.

What is being accomplished in physics, chemistry, physiology, pathology and biology has changed and will continue to change the face of medicine. While the impetus to specialization comes from the advances made in the sciences ancillary to medicine, progress is also determined by the trend of events in general surgery. As one region after another has become safe for surgery, specialization has been found to be necessary, both for the patient's sake as well as for the further increase of knowledge. All that used to be looked on in general surgery as one man's province cannot longer be so regarded. The surgery of the brain, the thorax and other regions each demands its votaries. In the hospitals and medical schools there has been a transformation which amounts to a revolution, the main agent being

the spread of the "laboratory idea" as Sir Arthur Keith calls it. Sir Arthur Keith regrets the modern tendency to separate teaching from research. "Time was when research was the pastime of amateurs. The replacement of the amateur by the professional has been made possible by subsidies from State as well as from private sources. That such endowments are speeding up the rate of surgical advance there is no doubt. 'They serve to water the trees on which the fruits of science grow' to borrow a simile of the late Sir Walter Fletcher."

An unfortunate effect of the new departure has been the desire of many of the best teachers to be relieved of the duties of their office in order that they may devote their whole time to experiment or other form of inquiry. The gift of teaching and inspiring young men is ranked below that of the ability to research. Keith (and there was no more inspiring teacher) believes that the ultimate result of assigning an inferior position to the teacher and book maker is as likely in the long run to impede the progress of surgery as to accelerate it. There may be some ground for Sir Arthur's fears, but a view of the activities of those who have been engaged in research under the munificient Gordon Craig bequest does not tend to confirm them. Teachers, however, as Osler insists, must have a full personal knowledge of the branch taught, not second hand information derived from books. Men are required to have a sense of obligation, "that feeling which compels a teacher to be a contributor and to add to the stores from which he so freely draws". To do this it is necessary to know the best all the world over. Osler's advice is to the point: "When a man talks slightingly of the position and work of his profession in any country, or when a teacher tells you that he fails to find inspiration in the work of his foreign colleagues, in the words of the Arabian proverb 'He is a fool, shun him'. Personal first hand intercourse with the men of different lands when the mind is young and plastic is the best antidote against ignorance." In the passing of the years the ignorance of the majority of surgeons of the methods and real worth of surgeons of their own and foreign countries has been replaced by knowledge gained through the medium of surgical clubs, societies and associations. Organized visits to home and foreign clinics have done much to remove the reproach of splendid isolation in which many surgeons dwelt twenty-five years ago. In certain fields of surgery there is now less inclination to consider operative treatment as the Alpha and Omega of surgery. "It behoves us, and it behoves us well to bear in mind that operations however perfect in themselves and in their results, are, excepting those rendered necessary by injury, and in some cases of deformity and senile change, in truth a reproach to us as a profession, in as much as they afford clear evidence of our failure, even at the present time to obviate the occurrence of the diseases and the conditions which render operation necessary. In fact the conception and carrying out of a great operation are liable to conceal the importance of the initial defect which leads to the necessity for its performance. The operation in most cases is but one step in the treatment, and not a magic intervention, a wave of the wand which shall make the patient live happily ever after. Chemical and physical agents are slowly but surely encroaching on the domain in which hitherto the surgeon has ruled supreme. The forecast that the operating surgeon as we know him will be a far less imposing figure than he is today is open to question. Accepting it to be true that the basis of surgery is handicraft there is lying behind it a far greater thing—the knowledge when to apply that craftsmanship of which everyone who now aspires to the practice of surgery should make himself a master." (Sir William Bennett.)

Nothing that has happened during the life of this journal to advance the art of surgery has modified by one iota the edict of the great surgeon who, before science had robbed operations of most of their horrors, said: "The all-important thing is not the skill with which you use the knife, but the judgment with which you discern whether its employment is necessary or not. In other words those who attach supreme importance to mere mechanical dexterity and technique in surgery not only fail to reach the high water mark of greatness but entirely lose sight of the grand possibilities of their calling." "Surgery of the brilliant kind", says Moynihan, "is a desecration. Such art finds its proper scope in tricks with cards, in juggling with billiard balls, and nimble encounters with bowls of vanishing goldfish." "It has been proven in many an orthopædic hospital that the surgeon who gets the best results is not the brilliant operator but the patient worker. The realization of this is leading to the replacement of the old surgery based exclusively on anatomy and pathology by a surgery which takes into account also the functions of the living body. In this respect orthopædic surgery has taken the lead. A fracture used to be regarded as a broken bone only; it is now viewed as a grave disturbance of function." Until recent years the average surgeon has focused his attention more on the immediate result of the operative treatment adopted by him than on the ultimate fate of the patient. He now tends to share the concern of his patient that the cure shall be complete and final. His solicitude has been ministered to by the foundation in the larger hospitals of departments with the special function of "following up". The accumulation of cold facts tells a true story which is fatal alike to surgical optimism or pessimism. As Moynihan pithily observes: "A surgeon may be a prejudiced witness as to his own efforts and a bad judge of his own merit."

Prior to the War, despite the work of Kocher, Horsley, Cushing and others, there was little thought of surgery being connected with anything but anatomy and that the anatomy of the dead. Australia has good reason to be proud of the contributions of Elliot Smith, Royle, Hunter and Woollard to the anatomy of the living and to experimental anatomy. Woollard's book, "Recent Advances in Anatomy", published in 1927, has had

a very widespread influence on the development of anatomy in the United Kingdom. He showed that, as a means of approaching problems of structural organization, the methods of experimental anatomy offer great opportunities and indeed are finally essential. The contact which he established with his clinical colleagues at the University of Adelaide, at Saint Bartholomew's and at University College was a new and refreshing departure and of great mutual benefit. Concentrating his attention on the problems of peripheral sensation, he, like Henry Head, had for some years permitted small but painful operations to be carried out on his own person in his aim to correlate the distribution of different sensory spots in his own skin with morphological types of nerve ending. In this way he applied the experimental method to the elucidation of an anatomical problem. Largely owing to the experimental work of Hunter and Royle, operations on the sympathetic system with the object of alleviating or curing certain pathological states are now employed. Failures after sympathectomy may be summarized as being due either to incorrect choice of the patient to be submitted to operation or to failure to perform the operation sufficiently well. The most striking advances of recent years have been in the realms of neuro-surgery and thoracic surgery (including the œsophagus and heart as well as the lungs), but there is ever much scope for research. Cushing, a superman of the present surgical epoch, is of the opinion that the surgery of the pituitary gland is practically in the Stone Age of its development. "The time will come ere long perhaps when the biochemist will have shown us how to cure most of the common functional adenomas of the pituitary and thyroid without surgery. Prevention will then come in its turn to supplant even these eargerly sought medicinal cures, and this will represent the golden age of the subject which not even the youngest of us are likely to see."

In the last twenty-five years surgery has achieved much. From time to time surgical prophets have made bold to foretell that surgery in general or in some of its branches has almost reached its limits. Time has invariably confounded them and revealed the folly of their predictions. With this in mind the wise course in looking forward is to share the fear of the angels and to refrain also from giving expression to a too exuberant optimism with regard to the future of surgery.

TWENTY-FIVE YEARS OF PREVENTIVE MEDICINE IN AUSTRALIA.

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"TIME, like an ever rolling stream, bears all its sons away." And as we sons of time pass down this stream we are so occupied in steering our frail craft, in avoiding rocks and shoals, or danger from sudden floods, or in gazing on surrounding scenery, or on our fellow voyagers, that we have little time or thought to look back on the tortuous course we have followed. Then when one does reach a placid backwater there comes from the bank the stern call of the Editor of THE MEDICAL JOURNAL OF AUSTRALIA on the occasion of its silver jubilee: "Write what you know of the course of preventive medicine in the last twenty-five years"; and one realizes in one's own person the torture one has so often inflicted on students in past years.

The one advantage of such a retrospect is that it induces temporary forgetfulness of present difficulties and discouragements in reading the record of achievement. But if one attempts any detailed record of such achievement, the difficulty is to condense and still retain right proportion. Most interesting of all is the recognition of the changes that have come over our outlook. And in a condensed paper like this it will probably be more profitable to discuss this aspect of the question than to attempt a detailed record of successes and failures.

Fortunately, too, we have certain landmarks which enable us to trace our progress. For the birth of THE MEDICAL JOURNAL OF AUSTRALIA twenty-five years ago was practically coincident with the beginning of the Great War, and we are thus provided with a very convenient starting point for our comparison of past with present.

Australia and the medical profession were fortunate in that the Australasian Medical Publishing Company, Limited, produced the first issue of the journal one month before the beginning of the War. For just as in war service, medical practitioners of different States could no longer think as individuals, or regard only their own State, but think and act only as members of a national medical service, so they for the first time in their history had a journal to speak for them and of them as a whole—to voice their needs, to emphasize their aims, to keep them in loyal cooperation one with another, whether overseas or at home. As I recall the difficulties of those first years of publication—so unexpected when we planned our beginnings—I wonder whether, had the journal not been born before the War began, it would ever have been born at all. Then I realize that the very force of circumstances engendered by the War would have compelled its birth—but at what cost and tribulation!

We were fortunate also in our first Editor, the late Dr. H. W. Armit. Before 1914 we had talked mainly of "public health". The term "preventive medicine" was comparatively new and little used, and the new outlook which it implied was hardly envisaged. Since the War we have talked largely of preventive medicine. These two streams of thought have of recent years coalesced into the greater stream which we call "national health". For the moment, one aspect, "physical fitness", is emphasized to the obscuring of others; but as we come to recognize the necessity of mental or psychical fitness if we are to secure true physical fitness we must go a step further and envisage "national fitness" to include all these terms.

Harking back to our beginnings. The first edition of Rosenau's standard text-book was published in 1913 and was entitled "Public Health and Preventive Medicine", and that, I think, was the first English text-book to use the latter term; prior to that they had been text-books of hygiene or public health. The late Dr. Armit came from England in 1914, thoroughly imbued with this new outlook and its implications. From the beginning of the journal he made this the central thought of his message; he preached it in season and out of season, not only in the columns of the paper, but in personal contacts and other ways. Since his death the journal under his successor has steadily pursued the same policy and its educative influence has been no small factor in widening our horizons of preventive medicine.

The War itself, with its experiences and experiments from 1914 to 1918, was another great factor in spreading and popularizing the ideas behind the term "preventive medicine". When it began, and when the journal was first published, we were imbued with the traditions inherited from last century, with the thought of the maintenance of a high standard of public health by control of man's inanimate environment. The last twenty-five years of the nineteenth century were the great years in spreading the gospel of sanitation of air, water, soil, food and milk, and premises. These ideas were embodied in the various State Health Acts dating from 1900 or thereabouts. Epidemics of typhoid fever and cholera had been successfully fought or prevented by control of sewage and water supplies; purity of food was secured by numerous regulations till the life of a restaurant keeper was hedged round with observances like that of a king. Individuals suffering from certain diseases were known to be capable of setting other cases of the same disease, but because "droplet infection" was unknown and because the different routes of infection had not been worked out, isolation of the sick was needlessly cumbersome and terminal disinfection was supposed to be sufficient.

The science of bacteriology had been born in the closing years of last century, and as it gained in strength and vigour in the early years of the century it led to emphasis on concurrent disinfection to supplement or replace terminal disinfection. The part played by insect vectors in such diseases as bubonic plague and malaria was proved at the beginning of this century; the discovery a few years later of typhoid and diphtheria carriers and then of the frequency of fly-borne infection still further brought into prominence the importance of biological factors in the causation of certain dieases, and that there were reservoirs of infection in animals and insects as well as in water and food. But at the beginning of the War, and of this journal, the concept of prevention of disease was almost limited to a comparatively few infections, and their prevention by methods of sanitation, disinfection and control of insect vectors.

Immunization of the susceptible individual was almost an untouched field of prevention. The prevention of smallpox by vaccination had remained for a hundred years as one born out of due time; and typhoid vaccination was still in the experimental stage. It was the War, with the necessity for experiments in prevention under conditions utterly opposed to the old concepts of public health, that brought about great changes. Men could not live under sanitary conditions, therefore they had to be immunized against typhoid and paratyphoid fevers. Surgery had been years ahead of medicine in the revolutionary methods for the prevention of sepsis after Lister introduced his antiseptic methods in the latter part of last century, and this had been followed by the development of the aseptic technique. But these aseptic conditions could not be maintained in warfare, and surgery had to devise new methods of prevention, first by return to antisepsis, then by the physico-chemical principle of irrigation and then by the excision of devitalized tissues prior to suture. Tetanus and gangrene had to be prevented as well as ordinary sepsis, and these methods have been continued when required in industrial and civil life.

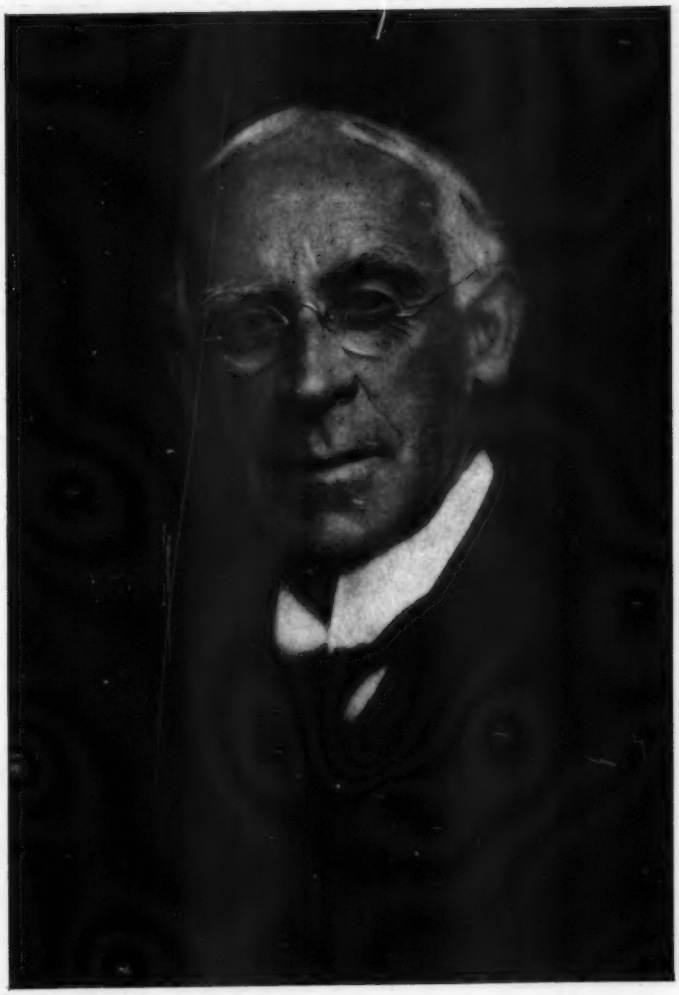
The prevention of venereal diseases had been attempted last century by social legislation, and the Melbourne Meeting of the Australasian Medical Congress in 1908 and, still more, the Sydney congress of 1911 had outlined the framework of a purely medical campaign against these diseases. But the execution of this campaign would probably have hung fire for just as long as was the case with the resolutions for the prevention of tuberculosis passed in 1911 by the conference of the principal medical officers of the different States, had not the experience of the War focused political attention on this venereal menace to national health. Through the public alarm over this menace the Commonwealth was able in 1915 to stimulate legislative action in the different States, and, still more important, to support or subsidize the provision of numerous free clinics for treatment. Similarly the Quarantine Department gave a lead to Australia in 1915 by enforcing regulations regarding notification and treatment of shipboard cases of syphilis and gonorrhœa. But for many years afterwards, quarantine officers had to put up with the gibes of overseas captains at this prudish attempt on

the part of the authorities to deal with the commonplace and ubiquitous. Time has shown the comparative impotence of legislative enactments and the importance of widespread facilities for early scientific treatment. It is universally agreed that the campaign has succeeded in markedly reducing the incidence of syphilis, so much so that medical students of today rarely see a primary chancre or a secondary rash of syphilis. And it has been publicly stated that in 1920 in Melbourne prenatal examination of women showed some 7% to be infected with syphilis, whereas a similar investigation last year showed only 1% thus infected. On the other hand, with the same administrative methods the incidence of gonorrhœa has shown practically no diminution. This difference in results is ascribed to the effect of arsenical preparations in shortening the infective period of syphilis, whereas no such remedy has existed for gonorrhœa, though recent experiences with sulphanilamide preparations have raised the hope that these will do for gonorrhœa what arsenical preparations have done for syphilis. These are after-effects, but the War brought the control of these diseases into actual practice.

Less generally recognized perhaps has been an indirect product of the War in quite another field of prevention. Factory Acts had been passed early in this century and regulations had been drawn up regulating the hours of labour, floor and air space, lighting, and other working conditions, all with the idea of preserving the health of the workers. In spite of these enactments the economic loss from sickness in industry remained at a high level. When the necessity for a steady high output of munitions was made evident, the health of munition workers became an urgent national question. This led to scientific investigations which established the advantage of more frequent short intervals for relaxation and food in maintaining a high level of health. In succeeding years this principle has been extended to civil life in various forms of industry till now the "rest pause" has become a recognized procedure in industry and a recognized term in the literature. (See "Recent Advances in Science and Industry.") Its proper application has necessitated the appointment of trained medical officers and investigators in all large concerns, like railways and tramway services and department stores. To the lives saved and lengthy illnesses averted by the widespread development of first aid services must be added the comfort and health of workers who previously have been prone to accident or sickness, through maladjustment to their particular job.

Thus the emphasis on the physical and chemical factors was followed by emphasis on the infective factors and these are beginning to be reinforced by emphasis on the psychical factors in the causation of functional diseases, which now have thus become preventible. For the bulk of morbidity in our national life is due to minor illnesses and functional disorders, the importance of which is never revealed by mortality statistics. In 1926 there were no morbidity statistics; even now we are only slowly accumulating them. The recognition of the value of the "rest pause" is slowly leading to the realization of the necessity of reestablishing in all phases of our life that rhythmical alternation of activity and rest which is a basic necessity of our physical and mental structure. The recognition of the psychical factor in the production of disordered function is bringing us nearer to that ideal in which we envisage the whole man in our campaign for national health.

These examples illustrate the stimulus that war experiences gave in turning preventive measures which had been sporadic, isolated and intermittent, into a unified national campaign with ever-widening objectives. But the impulse to this was at work quite apart from the War. Garrison, in his "History of Medicine", says that the administrative achievements of the War were truly remarkable and that "in medicine the greatest triumph of the War was the direct application of the science of infectious diseases to military sanitation". But he also styles the twentieth century as the beginning of organized preventive medicine and other facts show the truth of this in Australia. The past twenty-five years has seen the national development of such organized effort in all departments of human life. For instance, the campaign against infantile mortality was opened at the beginning of this century, when the public conscience was moved by the fact of over one hundred babies dying in the first year of their life for every thousand born. In centres so far apart as Sydney and Adelaide, Dr. W. G. Armstrong and the late Dr. T. Borthwick as city medical officers of health initiated measures for baby health work, and baby clinics under various names and forms of control quickly arose in different centres. But for the first twenty years of this century infantile mortality was treated as a whole; no distinction was drawn between neonatal and post-natal mortality, and stillbirths were regarded as an act of God, sometimes aided by the devil of syphilis. The first paper dividing neonatal mortality from that of later months appeared, I think, in THE MEDICAL JOURNAL OF AUSTRALIA in 1921, and even in 1926 statisticians were surprised at a suggestion for registration of stillbirths as a step towards their control. Prenatal clinics, as well as post-natal clinics, have now been established in every large city and hospital in Australia, and most medical practitioners have made prenatal care of the expectant mother a routine part of their practice. Obstetric teaching of medical students is gradually being put on a better basis; and although so far these measures have unfortunately resulted in no diminution of maternal mortality—unless newly awakened hopes from the use of sulphanilamide preparations are fulfilled—we are beginning to see a decline in the mortality of the first week and first month of life, apart from that dramatic



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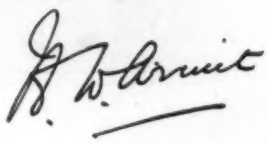
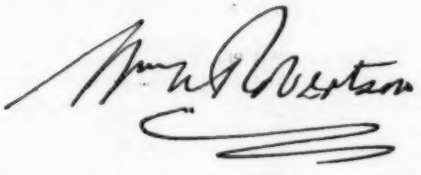
W. H. Craig





and steady fall in the first year as a whole, which makes our infantile mortality rates the envy of other countries.

At the beginning of the century the conception of national health was so far removed from practical politics that the only power in regard to disease handed over by the States to the Commonwealth in the *Constitution Act* of 1900 was that of quarantine to prevent the introduction of sea-borne diseases. The Commonwealth *Quarantine Act* was passed only in 1908; the Commonwealth Quarantine Department did not actively function until 1911. It gradually built up a service of maritime quarantine, with a trained personnel that some twelve years later was recognized in English-speaking countries overseas as "possibly the most advanced and efficient in the world". Early in the War it merged the old depot in Victoria, which provided calf lymph for vaccination against smallpox, into the Commonwealth Serum Laboratories, which have grown till they supply prophylactics for a great variety of infections, as well as curative vaccines and sera and products like insulin and pituitrin. The Quarantine Department has prevented cholera and typhus fever and yellow fever from ever entering Australia; it has repulsed numerous threatened smallpox invasions; it has for years been recognized by overseas health authorities as a valuable co-partner in the fight against bubonic plague, smallpox and other infections. But although the British Ministry of Health was formed in 1918 to correlate the activities of a multitude of previous health services, although the value of this was very speedily seen and successive British Governments subsidized more and more liberally the work of this Ministry of Health, in Australia the Quarantine Department was not enlarged into the Commonwealth Health Department till 1921. In spite of difficulties, it increased its influence year by year in coordinating and stimulating State activities against different diseases; yet in marked contrast to Great Britain, at the first cry of retrenchment in the depression of 1931, the Commonwealth Government proposed to relieve it of all its activities except Quarantine and the Serum Laboratories. Fortunately the attempt miscarried; and by the irony of fate subsequent outside developments have compelled the Department of Health to head the movements for the prevention of crippling, for the improvement of maternity services, for an organized campaign against cancer, for research into nutrition and for improvement in the health of the child in the preschool years.

As part of these activities, increasing attention has been given to the health problems of tropical Australia. Interest in these was revived early in the twenties by the discussions at the Australasian Medical Congress which was held at Brisbane in 1920. Interest was further revived by the visit of representatives of the Rockefeller Foundation and their revelation of heavy and widespread hookworm infection in north-eastern Australia. Cooperation between that Foundation and the Commonwealth Government and the Governments of various States led to a hookworm survey throughout Australia, and to a campaign for its eradication when found. From that time more and more intensive attacks have been made on the infections of tropical Australia and on the unclassified fevers of northern Australia, as well as on malaria and leprosy. Side by side with this has gone the study of living conditions in tropical Australia with a revolution in our ideas of ventilation, hygiene, clothing and food habits—all of which had been previously based on the standards of cold and temperate climates. Haphazard methods of settlement and preventive medicine have been replaced as elsewhere by orderly control based on scientific investigation. How interesting these are to the outside world, yet how much remains to be done, is shown by such works as Dr. Grenfell Price's recently published "White Settlement in the Tropics".

In addition these health activities were extended to the neighbouring mandated territories and outlying islands. During the past fifteen years the Commonwealth has held in Australia two successful International Pacific Health Conferences attended by representatives of all nations with interests in the Pacific. It has collaborated with the Eastern Bureau of the League of Nations (the director of which was trained in Australia) and in many other ways has assisted in developing ideals of public health in the Pacific. When our present Prime Minister this year calls on Australia to take its rightful part in the affairs of the Pacific, the medical profession can reply: "In preventive medicine we have been doing that for the past fifteen years." Our efforts cover the three arms of the preventive medicine service—education, investigation, friendly cooperation.

In quite a different category, yet possibly more far reaching in its ultimate effects than any of the stimulating agencies I have yet described, stand those resolutions of the General Medical Council in 1922:

> (1) That throughout the whole period of study the attention of the medical student should be directed by his teachers to the importance of the preventive aspects of medicine, and
>
> (2) that instruction should be given in the courses of Forensic Medicine or Public Health or otherwise, in the duties which devolve on practitioners in their relation to the State.

These resolutions focused attention on the importance of the general practitioner in any scheme for national health. They implied that if, as is so often glibly stated, the main object of modern medicine is the prevention of disease, it is logical that this ideal and methods for carrying it into practice should be taught to every medical student in every branch of his work. In country districts especially he is the only person competent to lead and instruct. Following on this, the late Sir George Syme made "Prevention of Disease" the theme of his presidential address in Melbourne in 1923 to the first Australian medical congress held under the auspices of the British Medical Association in Australia. A glance at that address shows how far we have travelled since.

Lectureships in public health and preventive medicine had been established in the medical schools in Sydney, Melbourne and Adelaide prior to these resolutions, but they raised the status of these lectureships. Surgery, of course, had been occupied with the prevention of sepsis since the days of Lister, and every medical student had absorbed its teaching. But in medicine and obstetrics the development has been slower. At the time I started lecturing in this subject in Adelaide in 1921, prenatal care was scarcely being taught systematically outside that class room, and few general practitioners were carrying it out in their general practice: in a few years this subject was dropped from that particular course because it had become routine teaching in other departments. At first certain attention had to be given to routes of infection and to modes of dissemination which are now wholly covered in bacteriology. This gave the opportunity of replacing them by lectures on the prevention of crippling, the prevention of heart disease, of nephritis, of diseases of middle age and even of cancer. Much remains to be done to carry out fully in the medical course the ideal of those resolutions, but much has been done, and one direct result has been the increased initiative of general practitioners in the preventive side of their work.

If as a participant I am permitted to include it, I would place the National Health Commission of 1926 as one of the other great contributory factors to recent advances. Officers and privates had returned from the War filled with enthusiasm at the successful efforts in the prevention of disease they had seen and shared in during the War. By 1926 many of them had become disillusioned. In civil life there was no central controlling authority and no means seemed available, or even possible, for the voluntary coordination of governmental, municipal and private effort.

The National Health Commission by its travels through Australia, by taking evidence in town and country on so many aspects of public health from so many different people, touched many who previously had been unrelated to concerted health measures, made many more realize for the first time that the health of the people was the people's job, began the breaking down of prejudices, and did, I believe, finally convince people that an honest attempt was being made to find a path out of our forest of difficulties in the fostering of national health. Apart from the clarification of ideas it wrought, apart from such immediate results as the closer correlation of statisticians with health officials, the registration of stillbirths and so on—it made three important recommendations—the establishment by Statute of a Federal Health Council with regular meetings, the establishment of a National Medical Research Council, and the establishment of a post-graduate school of training in public health and tropical medicine. All three recommendations have now been carried out, the first in 1927, the third in 1930, and the second in 1937. Their results are already apparent and will increase as the stream of time rolls on. One happy result is that State departments of health which, twenty years ago, laboured as isolated units, sometimes under great difficulties owing to local prejudices and mistrust, have become active participants in a coordinated scheme of research and prevention.

The essence of our advances in prevention then during the past twenty-five years has been the gradual pervasion or permeation of our community life with this ideal of an ever widening and more efficient campaign for the promotion of national health, in which campaign investigation, administration and educated cooperation of the medical profession and the public shall be linked up. Because permeation is a gradual process, it is impossible to define stages or tabulate results that will be free from dispute: there are naturally advances and apparent retrogressions. Advance has been more rapid in cities than in outlying country districts, partly because the need has been greater and therefore the public conscience more easily aroused, partly because necessary money has been more easily procurable. Thus Australian country districts have often been unfavourably compared with those of other countries in their lack of water carriage sewage systems and septic tanks: the critics are forgetful of the fact that in our dry country much expense must be incurred in providing an adequate water supply first, whereas in more favoured countries this is readily accessible from permanent streams. Again the rate of advance in a particular field varies in different countries. We stand humbled when we read that in New York last year with its population of seven and a half million there were 712 cases of diphtheria with 27 deaths, while in South Australia with a population of 600,000 there were 772 cases and 26 deaths. But then we know that New York started its campaign of immunization twenty years ago and has continued it with increasing intensity ever since, whereas in Australia we have only begun the campaign in the last few years.

Similarly, we have no right to boast that we have been so successful in our reduction of infantile mortality that the rate in Australia is amongst the lowest in the world and that in South Australia last year it was 30·5 per 1,000 births, the lowest yet recorded anywhere, because we know that we have been fighting this battle earnestly for forty years with advantages which more thickly populated countries do not possess. We have ceased to look at particular fields, we have ceased to extol one method of attack as a panacea. We recognize that typhoid fever and hydatid disease and primary syphilitic chancres, which were the commonest sights in our student days, are almost unknown to present-day medical students and that each has been conquered by a different method of attack. We recognize that our attack—even in sanitation—has become increasingly biological in its outlook and that the human factor becomes increasingly important. We recognize that the sentence in which Moran in his book "Viewless Winds" aptly sums up the position in regard to cancer—our greatest failure and our greatest problem in prevention—applies to a lesser extent to the whole field of pre-

ventive medicine: "So it all boils down to this, we have pushed a new salient here, we have captured a trench there, we have made local gains on a narrow front, but the campaign is still unwon, and everywhere a distressing guerilla warfare is going on in which our losses are great."

Garrison concludes his "History of Medicine" by quoting Wunderlich as saying in 1858: "The future aim of medicine is the task of finding the truth, whatever and wherever it is, and by whatsoever ways it may be found." And since preventive medicine is the practical application of that partial view of truth about a disease or diseases in general that we have learned at any particular time, it follows that our methods must go on changing and improving in the faith that we shall reap, if we faint not.

And now the Editor asks me to conclude this retrospect with a short prospective view. But that would be folly on my part. For in a retrospect one deals with facts—tinged, of course, by one's own personal experiences—but still available to all for confirmation; in a prophecy one only expresses opinions, not facts, and one's own personal opinion at that. Who, for instance, twenty-five years ago would have prophesied even the advances we have made—much less the nature of our advances. Success against tuberculosis at that time seemed most hopeful—we are still fighting it. On the other hand, the Health Commission in 1926 drew attention to the neglect of the preschool period; now we have a system of nursery schools which none of us visualized at the time. Thirty years ago we made detailed diet lists based on due relative proportion of main constituents of food, and vitamins suddenly appeared in view and made them all out of date; later the importance of minute quantities of mineral constituents upset our views. Nothing is certain but the unexpected. We search for vaccines to prevent the effects of invasions of bacilli and unseen viruses make their presence felt. We rejoice to learn that scarlet fever is caused by a *Streptococcus hæmolyticus*—and Griffiths a few years later presents us with a classification of 23 microorganisms of this type—at any rate that was the number when I last read the tape.

I cannot prophesy, I can only ask questions—and particularly two or three that have been recently bothering me.

The main emphasis in the political and administrative mind just at present is the question of nutrition—this includes both diet and digestion. Much attention is being paid to diet, but there seems to be little regard to the problems of digestion, although the latter process is just as important as the former if nutrition is to be maintained. This aspect becomes increasingly important as we deal with the nutrition of adults rather than of children. Sir George Newman some twenty years ago gave tables that showed that a large proportion of patients in private practice and in out-patient departments of hospitals are those suffering from some digestive disturbance. Apart from functional disorders, the incidence of peptic ulcer, appendicitis, gall-bladder disease and cancer of the stomach has steadily increased during the last twenty-five years. The increase cannot be wholly explained by improved diagnosis. It must in some way be related to diet or habits of life. What do we propose to do in regard to the prevention of these organic and functional disorders of the digestive system? I have seen interesting papers on the experimental production of peptic ulcers, but no practical suggestions for their prevention. Functional disorders especially would appear to be related to habits of life. Clinically one is struck with their frequency in commercial travellers and garage proprietors with their irregular meal hours. The investigations made recently in London into fifty-three children under the age of three years who were attending a nursery school and showed loss of appetite, bad temper or some other functional disturbance, proved that in the majority of cases these were due to unsatisfactory home conditions, such as bad habits on the part of one or both parents, domestic differences, and so on. If domestic conditions can so influence young children, how much more must they lie behind the functional diseases in adults?

Are we prepared to extend preventive medicine into social and economic fields, as recent papers in THE MEDICAL JOURNAL OF AUSTRALIA suggest is necessary, to control tuberculosis and venereal disease? Other examples, given above, of the trend of preventive medicine confirm the opinion expressed everywhere that medicine, besides being scientific, must become more and more social in its outlook. Theoretically we all agree with this, yet the distressing part of the discussion on the proposed national insurance scheme last year was the revelation of how individualistic still is the outlook of most members of the medical profession. More distressing was the fact that this insurance scheme only insured treatment for sick people and made no attempt at the prevention of sickness. Equally distressing was the revelation that the leaders of the profession, at any rate at first, failed to see this and were prepared to acquiesce in the scheme.

From the trend of subsequent discussion it has appeared as if the Commonwealth Department of Health was excluded from the measure; yet surely in any national scheme of health insurance health departments should be in the foreground.

A similar paradox is seen when one turns to quite a different matter, which the medical profession will be compelled to face in the next generation. It is bad enough that with all our efforts in the last twenty-five years to save infant life and to lessen accidents and illnesses in adult life, we should be compelled to acquiesce in measures of war which kill off those adults in large numbers. This problem involves national questions of policy in which we cannot interfere to any large extent. But it is still more paradoxical that we should be pushing our efforts to save infant life back to the very beginning of independent existence and rejoice in the reduction of mortality at all ages and especially in the first week of life, and that yet at the same time we should be taking no notice of those lives which are being prevented from coming into existence. Fourier said thirty years ago that syphilis was antisocial.

Abortion is even more antisocial, and contraception carried to the extremes which are at present practised is just as antisocial. The number of births steadily decreases each year as the number of motor cars increases, and children fail to appear for fear that the comfort of parents should disappear. Our efforts to improve national health are futile if in another twenty-five years there is a stationary population, as present figures indicate will be the case. For a stationary population means a dying nation, and what is the use of saving individuals if the nation dies?

Forty years ago mothers were killing their newborn babies by refusing to suckle them because of fashion or a desire for comfort. A body of medical men, in face of great opposition, set themselves steadily to save these lives by getting mothers back to natural conditions. Will members of the profession be prepared similarly to face this new and much more difficult problem which confronts the present generation? If not, the nation, like the individual,

> Despite those riches, power and pelf,
> The wretch, concentred all in self,
> Living, shall forfeit fair renown,
> And, doubly dying, shall go down
> To the vile dust from which he sprung
> Unwept, unhonoured and unsung.

TWENTY-FIVE YEARS OF PROGRESS IN MEDICAL RESEARCH.

By C. H. KELLAWAY, M.C., M.D., M.S. (Melbourne), F.R.C.P. (London), F.R.A.C.P.,

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WE live in an age in which each successive period of time seems to yield progressively greater enrichment of knowledge. The last quarter of a century, though it included the Great War which was partly stimulating and partly inhibitory in its effects, was not exceptional. In the year of the peace treaty Einstein put forward his special theory of relativity and in the years that have followed we have gained a wholly new insight into the constitution of the universe. The discoveries, at the end of the last century, of X rays, of radioactivity and of the electron have led to the fulfilment of the dreams of alchemy, to transmutation of the elements, to the recognition of isotopic elements and to knowledge of the structure of atoms. X ray spectrum analysis has shed new light on molecular structure. There have been amazing developments in speed of communication between distant places—great technical improvements in aeroplanes, turbine machinery and wireless. We have seen the beginnings of television and the invasion of the stratosphere.

Though the biological sciences cannot perhaps offer such epoch making discoveries, progress has been none the less astonishing. Not content with flying the Atlantic in 1927, Lindbergh has devised a pump which in the hands of Carrel and his associates has made possible the satisfactory nutrition of whole organs under aseptic conditions *in vitro*. The tissues remain alive and their nutritional requirements may be determined. Their functional behaviour and structural modifications may be observed under accurately defined conditions. We are thus provided with a key which may open some of Nature's closed doors. The problems of the response of tissues to injury, of immunity, of the growth of the fœtus *in utero*, of the interactions between organs and of the effects of hormones and "tissue hormones" are now open to a new kind of attack.

The science of biochemistry, which twenty-five years ago was a swaddling infant, is now a lusty young adult and every year we are learning more of the relationship between chemical structure and vital function, and about the intricate processes that are going on in the chemical laboratories of the cells. The vastly different behaviour of substances which have a common basic structure can be illustrated by the relationship recently shown to exist between cholesterol, ergosterol, vitamin *D*, the bile salts, the sex hormones, the aglucones of the cardiac glucosides and of the toad poisons and some powerfully carcinogenic substances. These all possess a phenanthrene ring system. This condensed system of three benzene rings with a fourth five carbon ring forms the cholane nucleus which is found in bile acids, cholesterol, ergosterol and other sterols. Ergosterol is transformed by ultra-violet light to calciferol (vitamin *D*), the anti-rhachitic vitamin, which is essential for the normal metabolism of calcium and for the formation and growth of bone. The female sex hormones, œstrone and progesterone, which control the menstrual cycle and prepare and maintain in the uterus conditions suitable for the developing ovum, and the male sex hormones androsterone and testosterone, all possess the cholane nucleus. The close relationship of the aglucones (that is, the non-carbohydrate part of the molecule in the cardiac glucosides) has been shown by the fact that by dehydrogeneration they yield a hydrocarbon with the cholane nucleus. Finally certain phenanthrene derivatives are powerful carcinogenic

agents, and, painted on the skin of mice and rats, produce tumours indistinguishable from those which occur naturally, capable of being transplanted to normal animals and fulfilling all the criteria of malignancy.

Great advances have been made in our knowledge of the proteins. The application of the ultra-centrifuge technique by Svedberg has given information about their molecular size and is of great help in determining the homogeneity of soluble proteins. By kataphoresis individual proteins in such mixtures as serums and venoms have been separated. The study of films spread on water and solid surfaces has given insight into the shape of the molecules and X ray diffraction studies have afforded data in regard to insoluble proteins with fibrous structure, for example keratin. The methods of hydrolysis and of isolation of individual amino-acids have been greatly refined and an accurate quantitative account of the majority of the component amino-acids can now be given. Bergmann and Niemann have shown the regularity of the arrangement of the amino-acids in a number of proteins and have related this periodicity to the size of the molecule. Kögl and Erxleben have shown that in malignant tumours the amino-acids, unlike those from normal tissues, tend to be in the racemic form. This is notably true of glutamic acid which occupies a central position in amino-acid metabolism and is also a link with the carbohydrate metabolism of the cell. This new discovery gives a hint of the deep-seated structural difference between the proteins of normal and malignant cells which may make the latter inaccessible to the action of normal intracellular enzymes. Antibodies have been shown to be well defined proteins which differ significantly from normal proteins. The specificity of many active substances in the body has been found to depend upon their combination with specific proteins, for example, the yellow respiratory ferments of Warburg and a series of other respiratory enzymes which have hæm as a prosthetic group. A considerable number of enzymes have been obtained in the crystalline state and shown to be composed of homogeneous protein molecules, and we have a fuller understanding of the activation of enzymes, for example, the change from trypsinogen to trypsin. It is of interest to note that the phenomena of the coagulation of the blood can now be regarded as a manifestation of the action of specific proteolytic enzymes.

The story of the hormones, those chemical messengers which are elaborated mainly in ductless glands and which exert such far-reaching effects in bodily economy, must be rewritten in the light of knowledge gained during the last twenty-five years. The pituitary has been shown to have exceedingly complex functions. The secretion obtained from the posterior part of the gland is now known to contain two active principles—oxytocin which powerfully stimulates the uterine muscle to contract, and pitressin which constricts the arterioles and capillaries and antagonizes insulin. The anterior portion of the gland appears to manufacture a number of hormones some of which have been extracted from it in different ways but have not been isolated. There are a growth-promoting hormone, two sex hormones with distant control upon the gonads, a hormone controlling lactation, an adrenotropic hormone which accounts for the close inter-relation with the adrenal, and a thyreotropic hormone. Then there is the relationship between the pituitary and the pancreas revealed by Houssay's observation that animals from which both organs were extirpated did not develop pancreatic diabetes and could survive, and finally the effect of the pituitary upon fat metabolism.

In 1921 Banting and Best discovered insulin, the active principle which is secreted by the islet tissue in the pancreas. This principle which has been crystallized is a protein containing sulphur and has most complex actions. It increases the oxidation of glucose in the body and causes also increased carbohydrate storage as glycogen in the muscles and liver; at the same time it arrests the formation of sugar from amino-acids. Consequently when injected into an animal it causes a profound fall in the level of sugar in the circulating blood. This fall in blood sugar level has a stimulating effect on the central nervous system, causing a compensatory mobilization of liver glycogen both directly and by the liberation of adrenaline. In the diabetic, insulin not only causes the blood sugar to fall by enabling the tissues to utilize glucose and to store it as glycogen, but it prevents the excessive utilization of body fat and the formation of ketone bodies. The hypoglycæmia produced by excessive dosage of insulin and the severe symptoms which sometimes ensue may be overcome by the administration of glucose orally or if necessary intravenously.

During the war years Kendall isolated the active principle of the thyreoid gland, thyroxin, and in 1926 Harrington synthesized the substance and showed its relationship to the amino-acid tyrosine which is almost certainly its precursor in the body. In the same year Collip isolated the parathyreoid hormone which has been found to play an essential part in calcium metabolism. In 1930 Swingle and Pfiffner were able to obtain active extracts from the cortex of the adrenal glands which in sufficient dosage keep alive animals that have been deprived of these essential organs.

The story of the vitamins has undergone great changes. Starting from moderate beginnings based on the classical observation of Hopkins in 1906 that diets of highly purified protein, fat, carbohydrate and salts were insufficient to maintain health and normal growth and from the known clinical facts together with a few experimental ones concerning beriberi, rickets, pellagra and scurvy, the elaborate structure of present day knowledge of the vitamins has been built up during the last quarter of a century. Deficiency of vitamin *A*, which is fat-soluble and growth-promoting, is manifested by degenerative changes in the epithelium and in the nervous system, by xerophthalmia, by night-blindness, and by reduction of the normal resistance to infecting organisms. It appears to be taken into the body as the vitamin itself or as a precursor, one of the carotenes. The substance was synthesized in 1937 and its molecular structure is known. Vitamin B_1, the anti-neuritic vitamin, is one of a group of water-

soluble vitamins. Its absence is the cause of beriberi. It has been isolated in pure form and was synthesized as a crystalline substance in 1936. Vitamin B_2, the anti-pellagra vitamin, must now be regarded as a complex. One factor is identical with lactoflavin which has been synthesized. The animal body apparently needs this for the elaboration of the yellow oxidation ferments of Warburg whose structure, apart from the protein with which they are combined, is now known. Lactoflavin administered in pellagra causes some improvement but not cure. The pellagra-preventing factor is nicotinic acid. Castle's extrinsic factor is also a member of this complex. This substance taken in with the food reacts with an intrinsic factor from the gastric mucosa and gives rise to an agent which is stored in the liver and which is essential for the maturation of the red blood corpuscles. Still another factor in this complex, which has not yet been isolated, is demonstrated by the prevention and cure of experimental pellagra in rats. In 1932 Szent Györgi suggested that vitamin *C*, the anti-scorbutic vitamin, was identical with hexuronic acid which had been shown to be present in the adrenals in large amounts and which was named by him "ascorbic acid". Haworth and his colleagues in 1933 performed the synthesis of l-ascorbic acid from a simple carbohydrate and later proved its identity with vitamin *C*. Vitamin *D*, the anti-rhachitic vitamin, has been obtained in pure form. As already noted, it is derived from ergosterol by ultra-violet radiation. Vitamin *E*, which is important for the fertility of some animals, was isolated by Evans and his colleagues in 1936 from the unsaponifiable fraction of wheat germ oil. The substance, α tocopherol has since been synthesized. Even this does not exhaust the list of vitamins that are now known to exist. Vitamin *K* plays a part in the formation of the precursor of prothrombin and a rich source is to be found in cabbage, and vitamin *P* occurs with vitamin *C*, is important for the integrity of intercellular substance and its absence helps to determine the lesions of scurvy.

In physiology, the period under review has seen many new developments. Pavlov by the study of conditioned reflexes has provided a method for the objective analysis of the functions of the cerebral cortex in animals. Magnus and his colleagues have analysed the postural reflexes and have displayed their mechanism and importance in animal behaviour. The work of the Sherrington school has thrown fresh light on the processes involved in coordinated neuromuscular activity. The researches of Loewi, Dale and many others have pointed to the significance of acetylcholine in the transmission of nervous impulses. We have much new knowledge of the secretion and function of the cerebro-spinal fluid. Many workers have been engaged in the investigation of the cardiovascular system with a rich yield in knowledge concerning the nutrition of the heart, the cardiac output, the nature of the arrhythmias, and the function of the capillaries and of the peripheral circulation as a whole. Our knowledge of the nervous control of the circulation has been greatly enlarged particularly by the discovery of the buffering action of the carotid sinus and aortic reflexes. Lewis and his colleagues have studied the reactions of the vessels of human skin to injury. The part played by histamine in these vascular responses to injury of various kinds has been defined and the importance of the chemical laboratory of the cell in setting free active substances with powerful local effects—"tissue hormones"—is being recognized. The physiology of absorption has been further revealed by the observation of the pumping action of the intestinal villi and much new knowledge has been obtained about the liver, both in metabolism and in the circulation of bile. The study of metabolism has been advanced by the introduction of new methods—for example, the replacement of hydrogen by deuterium (heavy hydrogen). The functions of the kidney have been explored by the ingenious and skilful investigation of single secreting units and of the explanted organ. The significance of carbonic anhydrase in the transport and excretion of carbon dioxide has been discovered. The study of tissue oxidation has been advanced notably by the researches of Warburg which have demonstrated the activity of a number of intracellular ferments. The steps in the hæmoglobin-bile pigment cycle are being displayed by the discovery of new pigments. We have much new knowledge of muscle contraction and of the processes of excitation and conduction in nerve. In these last researches the electrical changes have been extensively studied by wireless amplification which has even been applied to the cortex and resulted in the discovery of the Berger rhythm (action currents from the occipital cortex when it is not receiving visual afferent impulses). Even the still unexplained mystery of sleep has been investigated by the production of similar states in animals by stimulation of the grey matter in the mid-line behind the thalamus, by the injection of ergotoxin into the third ventricle (Hess) or by the provision of a stream of afferents from the carotid sinuses by increasing the pressure within them (Koch).

Experimental embryology has made great strides through the development of micro-manipulation and improvements in the technique of tissue culture. The differentiation of tissues has been related to definite chemical substances (organizers) and a fascinating hint has been provided that eventually we may reach a coordination of the processes of embryonic growth and carcinogenesis.

In pathology, tumours of bone and of the brain have been classified and rescued from their former chaos and the nature of melanotic tumours is now more clearly understood. The importance of metaplasia in pathological processes has been recognized and the use of injection methods has yielded important data concerning the nutrition of organs in health and disease. The isolation by Valy Menkin of a chemical substance which causes vascular changes and the accumulation of leucocytes in inflammation, links up with the increasing knowledge of "tissue hormones".

From classical bacteriology attention has largely shifted to research on virus diseases in the knowledge of which notable progress has been made. Our views concerning immunity have been greatly modified by the researches of Avery and his co-workers on the types of pneumococci, and the fascinating studies

of Landsteiner and his colleagues on the development of new antigens by combinations of simple chemical substances with proteins. Inoculation against the typhoid and paratyphoid infections was shown to be of great practical use in the World War (1914-1918) and the recent war in Spain has brought into view preventive inoculation against tetanus and the gas forming anaerobes. The practical application of the Schick test and the development of a safe immunizing agent in toxoid have made possible the elimination of diphtheria.

Medical research is somewhat difficult to define and nearly all the discoveries in the various branches of biological science I have mentioned may be regarded as being within its scope. In the strictest sense it is concerned with the systematic investigation of human disease and may be directed either to the definition of hitherto unrecognized symptom complexes and their relation to ætiological agents, to the analysis of symptoms, to the development of more exact diagnostic methods and to the discovery of measures for prevention, control and treatment.

In the period under review much new knowledge has been gained concerning diseases caused by viruses and by Rickettsiæ. A number of new diseases of this ætiology have been recognized and viruses have been shown to be the responsible agents in others. Apart from these, two instances may be cited of the investigation of new diseases which illustrate the value of the clinical and the laboratory approach respectively to problems of this kind. In 1917 von Economo described the varied symptom complexes of *encephalitis lethargica* and since then much additional knowledge has been provided by numerous observers, though the ætiology of the disease remains obscure. In 1917 also the *Bacillus abortus* form of undulant fever was recognized, Alice Evans having shown the relationship of *Bacillus abortus* to *Bacillus militensis*.

In 1934 Lewis in his book entitled "Clinical Science" admirably defined the scope and some of the methods which can be used in the definition of diseases, in the determination of their ætiology and course and in the analysis of symptoms. The knowledge requisite for the study of such problems is derived, in the first place, from the accurate and critical observation of phenomena in living man in health and disease, from the exact study of the morbid anatomy of disease and from related and significant experiments in animals. To man himself the experimental method must be applied, but with stringent limitations, no experimental method being used which involves the slightest element of risk to the subject, though with his approval methods involving temporary discomfort may be applied. For example, in the study of a transient symptom it is better to rely upon its reproduction under observation than upon its description by the patient. Lewis points out also the opportunities which are available to the surgeon to study the results of injuries caused by accidents of various kinds and draws attention to the valuable knowledge gained by relating the site, nature and extent of lesions in the nervous system to the signs and symptoms observed in patients. Much of our knowledge of the physiology of the nervous system comes from this source, for example, data concerning the function of the *corpus striatum* have been obtained by the study of *paralysis agitans*, of the post-encephalitic syndrome and of progressive lenticular degeneration.

The work of Lewis and his associates illustrates some of the results obtained in recent years by the application of these methods of clinical research. For example, the study of the reaction of the skin to injury produced by light or heavy stroking led to the discovery of a type of response in the blood vessels which is common to a number of different forms of injury, and to the recognition of the part played by liberation of histamine in the triple response. The study of muscular pain in intermittent claudication has shown that this is determined by a chemical stimulant developed in the muscle while it is contracting. This reaches a threshold in the tissue spaces sufficiently high to cause pain if the circulation is obstructed. Further studies make it likely that anginal pain results from relative ischæmia of the heart muscle. Another excellent example of the use of direct experiment in man is afforded by the work of Denny-Brown and Robertson on the mechanism of micturition in normal subjects and in patients with various nervous lesions. For many problems, however, animal experiments are essential, particularly if it is possible to reproduce in them conditions similar or identical with those observed in man, but the greatest caution must be exercised in the application of these results to human problems.

During the period under review many new diagnostic methods have been evolved. The Aschheim-Zondek test by the injection of the urine into mice and observation of hæmorrhagic follicles in the ovaries gives very early diagnosis of pregnancy. The sedimentation test introduced by Fahraeus in 1918 indicates the progressive nature of infective processes. Apart from the amazing technical improvements in diagnostic radiography during the last few years, various new measures have been applied in the investigation of special regions. Kymography and tomography have established their value in the diagnosis of cardiac and pulmonary conditions and Röntgen cinematography gives promise of usefulness in the investigation of continuous changes. X ray photographs of the lungs after the intratracheal injection of lipiodol gives accurate information about the state of the bronchial tree and the presence of bronchiectasis, cysts or cavitation of the lung. Lipiodol has also been used since 1921 for the localization of spinal tumours and of compression of the spinal cord. In 1923 Graham observed that the gall-bladder became opaque to X rays after the injection of sodium tetrabromphenolphthalein. Evidence may thus be obtained of the function of the gall-bladder and of the presence of stones. In 1918 Dandy showed how the outlining of the ventricles by X rays after the injection of air could give information about the position of cerebral tumours. The method of excretion pyelography by the injection of "Uroselectan B" (Benz, 1930), radiograms being obtained at intervals thereafter, gives a measure of the functional activities of one or both kidneys. The gastroscope has been perfected and permits the study by direct observation of chronic gastritis, peptic ulcer and of gastric neoplasms,

and the thoracoscope is finding increasing application in the diagnosis of intrathoracic conditions.

Many attempts have been made to estimate the functional capacity and the extent of disease in essential organs. Among these may be mentioned the test devised by Van Slyke and his colleagues for the estimation of renal function, the enumeration of casts and red blood cells in the twenty-four hours' urine by the method of Addis and the Van den Bergh reaction, which enables us to differentiate obstructive from hæmolytic jaundice and gives information about bile pigments and their precursors in the blood.

Some of the most spectacular results of clinical research have been in the treatment of disease. In 1917 Wagner von Jauregg treated general paralysis of the insane by superinfection with malaria. In 1916 the treatment of *purpura hæmorrhagica* by splenectomy was introduced and has continued to yield successful results. The war years also gave us the prophylaxis of wound tetanus by the injection of antitetanic serum and the development of gas gangrene antiserum for the treatment of anaerobic infections.

In 1916 the discovery of insulin made it possible to effect dramatic cures in diabetic coma and to enable sufferers from diabetes to live prolonged and useful lives. The occurrence of hypoglycæmia led to the recognition of the symptoms resulting from tumours of the islet tissue and to the successful treatment of these by operation and of less severe hyperinsulinism by glucose therapy. Another important development has occurred in recent years. Sakel observed considerable mental improvement in drug addicts following the accidental induction of insulin hypoglycæmia and five years ago introduced this method for the treatment of primary dementias. Meduna, observing that epilepsy and schizophrenia rarely coexist, induced convulsions by intravenous injection of an analeptic, "Cardiazol". The combination of these two methods has been most successful in the treatment of schizophrenia.

The story of the treatment by liver feeding in pernicious anæmia, introduced by Minot and Murphy in 1926, is a classical example of research in clinical science. It commenced with a prolonged dietetic study of this disease and the use of liver was probably influenced by the previous experiments of Whipple on anæmia produced by hæmorrhage in dogs. It led directly to the work of Castle on intrinsic and extrinsic factors in hæmopoiesis, and to the development for parenteral injection of potent extracts which have made it possible to produce a rapid response of the bone marrow in severe megalocytic anæmia. It was soon realized that subacute combined degeneration of the cord was a nutritional disease, that the signs and symptoms of peripheral neuritis disappear and that even the effects of lesions in the cord may be diminished by the exhibition of liver extract.

The application of recent advances in physiology to medical problems is illustrated by the recognition of new types of nutritional disorders and by the use of vitamins in treatment, for example, B_1 in the treatment of peripheral neuritis of nutritional origin. Other excellent examples are afforded by the use of adrenal cortical hormone in the crises of Addison's disease, of sodium chloride for the maintenance of these patients in fair health during less acute periods, and of eserine or prostigmin in the treatment of *myasthenia gravis*.

Great advances have been made in drug therapy during recent years. A host of new synthetic preparations are being put on the market, some of which have proved to be of value. I may instance the use of quinidine in the restoration to normal rhythm in auricular fibrillation and flutter, the development of a large number of barbituric acid derivatives as narcotics and basal anæsthetics, of barbiturates in epilepsy, of analeptics to overcome excess dosage of anæsthetics and narcotics, of quinine derivatives in the treatment of malaria, of new local and spinal anæsthetics and of powerful organic mercurial diuretics like "Salyrgan". In 1920 the most efficient remedy yet known for African sleeping sickness was discovered—"Bayer 205". In 1932 Domagk applied to the treatment of streptococcal infections in mice a red water-insoluble basic azo dye, "Prontosil", which had been made some twenty years earlier and used as a dye for textiles. In 1935 Domagk developed a soluble dye for parenteral administration. Fortunately it was early recognized that some of the activity of "Prontosil" was attributable to the formation in the body of sulphanilamide and this made it possible for work to go on in other countries unhindered by patent rights. A number of sulphanilamide derivatives have been investigated and one of the most recent, "M and B 693" has been shown to attack pneumococci, gonococci and meningococci as well as streptococci. The discovery of the value of the sulphanilamides and allied compounds opens a new chapter in chemotherapy and for the first time a really efficient attack is possible against bacterial infections in man. The brilliant results obtained with these compounds in puerperal sepsis and in streptococcal, meningococcal, gonococcal and latterly in pneumococcal infections have elevated Domagk's discovery to the first rank, and make it probable that many bacterial infections will be overcome by the preparation of suitable chemotherapeutic agents.

I have recently in these pages[1] discussed the development of medical research in Australia and have indicated the opportunity that now exists for young graduates to take up medical research as a career. The founding of institutes of research attached to hospitals and the recognition of the necessity of a close relationship between medical schools and teaching hospitals should lead to the development of strong schools of clinical research in Australia, particularly since opportunities for the training of young graduates for research are being provided by the National Health and Medical Research Council. If Australia is to play its part in progress during the next quarter of a century there will be needed not only whole-time laboratory workers in medical schools and institutes, but above all men with good clinical and laboratory training who will devote themselves to the advancement of clinical science.

[1] "Stawell Oration", THE MEDICAL JOURNAL OF AUSTRALIA, February 26, 1938, page 385.

CHANGES OF TWENTY-FIVE YEARS IN THE OUTLOOK ON INFECTIOUS DISEASE.

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EPIDEMICS have been part of everyday human existence since time immemorial, and men of every age have tried to reduce the facts of infectious disease to some general form. Ever since the book of Frascatorius on contagion (1546) there has been a crudely scientific epidemiology. Gradually more and more diseases were separated as distinct clinical entities from the former inchoate mass of fevers and agues, and this process was well advanced by the beginning of the bacteriological era.

Scientific medical bacteriology may be said to have started with the work of Davaine about 1865 on anthrax in sheep. This established a *prima facie* case for the incrimination of a large non-motile bacillus, found in large numbers in the blood of animals dying of anthrax, as the cause of the disease. In 1876 appeared Koch's first report on the same disease, in which he established once and for all the specific character of the infection, and the importance of the spore stage in the natural history of the disease. This work opened the Golden Age of bacteriology, when from Koch's laboratory came a succession of technical discoveries in regard to methods of cultivation and staining, and a steady stream of announcements that this or that bacterial cause of disease had been discovered. In the same period Pasteur and his collaborators were laying the foundations for the science of immunity by their work on immunization against anthrax and chicken cholera.

In 1939 the science of bacteriology is almost exactly seventy-five years old. In this paper it is my task to indicate how knowledge won in the first half century of its existence was applied and extended in the last twenty-five years. With a certain inevitable tendency to over-simplification, one can indicate the general trend of each of the three quarter centuries concerned in a few sentences. From 1865 to 1890 (the Golden Age) the great fundamental discoveries in technique were made, and most of the commoner pathogenic bacteria isolated. The possibility of the extension of Jennerian methods of vaccination to other diseases was established. The period 1890 to 1914 saw the growth of immunology to the rank of an independent science. It opened with von Behring's discovery of antitoxins against diphtheria and tetanus bacilli; it includes the memorable controversies between the schools of Bordet and Ehrlich, out of which a theoretical basis for the study of immunity developed. The last quarter century has seen, first, immense technical applications of bacteriological knowledge to the medical problems of the Great War of 1914 to 1918, second, the growth of knowledge about the filterable viruses, almost to the status of an independent science, and finally the gradual development of what is best termed an ecological point of view in regard to the general problems of infectious disease.

The Influence of the Great War (1914 to 1918).

Wars have always been accompanied by infectious disease, and that of 1914 to 1918 was no exception. But as the first Great War fought with modern scientific methods, it was epidemiologically of particular interest. On the one hand there was an immense movement of human populations from one part of the world to another; troops and labour battalions from every corner of the globe were piled into Europe, bringing their own microorganismal parasites and meeting others to which they were unaccustomed. It was a process that might have been specially invented to breed and disseminate infectious disease. On the other hand, by 1914 knowledge was available to enable most of the great pestilences of former wars to be controlled. Enteric fever and dysentery could be dealt with by efficient latrines and chlorinated water supplies; typhus was known to be a louse-borne infection and malaria to be carried by mosquitoes. Even in a civilized country at peace constant vigilance is needed to keep these diseases at a minimal activity, and under war conditions there were many large-scale breakdowns in disease control. Dysentery and paratyphoid fever were rife in Gallipoli and Mesopotamia, but were relatively unimportant on the western front. Typhus filled its traditional role in the campaigns in the east of Europe, while malaria was as important as enemy activities in determining success and failure in Palestine and Salonica. Everywhere there was a constant struggle between the resources of hygiene and bacteriological technique, backed by military discipline, and the infinite capacity of the microorganisms to multiply in hordes of human beings living without the ordinary decencies of life. Whenever central authority disintegrated and the organization of military hygiene failed, disease and famine took complete control. The deaths from typhus and dysentery rose into millions in Russia during the early years of the Revolution.

On the whole, experience with these preventable infections during the War only confirmed previous knowledge that they could be checked if conditions were such that the necessary control could be applied. Respiratory infections, however, provided a more difficult problem, which has not yet been solved. Military camps have always been liable to epidemics of respiratory infection, often of types uncommon in civil life. There is always a proportion of men who have formerly lived in the country and so

avoided many of the infections which most city dwellers meet during childhood. Measles frequently appeared and, particularly in some American camps, was highly fatal on account of the associated bronchopneumonia. Cerebro-spinal meningitis is very rare in adults under normal conditions, and apparently demands a high degree of crowding before the "infective potential" is raised sufficiently to provoke appreciable numbers of clinical cases. In some camps a very high proportion of individuals were found to be carriers of the meningococcus before the epidemics gathered force. Influenza was common throughout the War years, and there is some warrant for Greenwood's belief that the great pandemic of influenza in 1918-1919 was only the culmination of the whole process by which the frequency and severity of respiratory infections had been increased. The pandemic of influenza affected every country in the world; only a few isolated islands, St. Helena, Norfolk Island and one or two others, escaped. The death rate varied from about four or five per thousand in most European populations to an extreme of 25% in the Samoan Islands, and it was calculated that all told about 25,000,000 deaths were a direct result of the pandemic. At that time the ætiology of influenza was unknown, so that no definite reason could be given for the many curious epidemiological features of the pandemic, notably the sharply changed age incidence of deaths and its progression in three distinct waves.

The Development of Virus Research.

A glance through a bacteriological textbook published about 1913 will indicate at once what a remarkable increase there has been in the knowledge of those infections which are due to viruses and rickettsiæ. There are only two viruses mentioned in any detail in the 1913 edition of "Muir and Ritchie", that of smallpox and vaccinia and rabies virus. Typhus fever was known to be louse-borne and to be capable of transmission to guinea-pigs; but the microorganism had not been seen.

In the intervening period several important human diseases have been shown to be due to viruses, and a whole series of new technical methods has been developed for the experimental study of these diseases. The following is a list of the human diseases which have been shown to be due to well characterized viruses during the past twenty-five years: yellow fever (Stokes, Bauer and Hudson, 1928), influenza (Smith, Andrewes, Laidlaw, 1933), psittacosis (Bedson and Western, 1930), *lymphogranuloma inguinale* (Hellerstrom and Wassen, 1930), *herpes simplex* (Gruter, 1914), several forms of encephalitis in Australia, the United States of America and Japan, and a number of rare disorders which may be contracted from animals.

To these we may add the rickettsial infections due to small bacilliform microorganisms which are easily visible microscopically but, like viruses, can multiply only within the cells. These are: (i) classical or louse-borne typhus; (ii) murine or endemic typhus, first recognized as being spread by rats or mice by Hone, of Adelaide, in 1920; (iii) Rocky Mountain spotted fever, the ætiology of which had been worked out by Ricketts in 1907; (iv) tropical scrub typhus, including Japanese (*tsutsugamushi*), Malayan, Sumatran and North Queensland forms, all spread by mites and with an animal reservoir of small rodents; (v) the recently described "Q" fever of south Queensland, the rickettsia of which is apparently a natural parasite of the bandicoot.

A number of practically important procedures have grown out of these researches. The most spectacular is an efficient method of vaccination against yellow fever, which was a direct outcome of Theiler's success in developing a strain capable of growing in the brain of the mouse. Other useful methods of vaccination against rickettsial diseases have been developed, and (a less important matter) Rivers's method of protecting laboratory workers against psittacosis by live virus given subcutaneously also appears to be efficacious. It cannot yet be stated that an effective method of vaccination against influenza has been developed; but work on the subject is proceeding rapidly, and if another pandemic of serious influenza should arise, positive attempts to block its spread by some method of vaccination will undoubtedly be made, possibly with some success.

The isolation of the viruses of influenza and yellow fever has allowed great progress to be made in the elucidation of the epidemiology of these two major human pestilences. Influenza is now not an inclusive term for any human fever for which no other diagnostic label can be found. It is a specific infectious disease due to a well defined group of related viruses. Interest in the influenza bacillus of Pfeiffer has almost vanished, though it is still possible that the varying intensity of different influenza epidemics may be related more to the bacteria which accompany the virus than to intrinsic differences in the virus strains primarily responsible. In the light of recent work, an attempt may be made to offer a partial explanation of the nature of the great 1918-1919 pandemic.

The influenza virus is characteristically labile in virulence. Experimentally it is easy to adapt it to such alien hosts as the mouse and the chick embryo, and there is evidence that under natural conditions it may vary also in its antigenic character; in other words, infection by one strain may not provide full immunity against infection by another. In all probability the pandemic resulted from the appearance of a variant or mutation of an antigenic type which had not previously appeared, and against which no basal immunity was present. The virus therefore spread with unusual rapidity and had fresh opportunities to gain virulence and to produce other antigenic variants. The appearance of three distinct waves with very little indication that infection in one wave protected against infection by a following one probably means that each was due to a new antigenic variety. If this interpretation is correct, attempts to deal with another pandemic will tax the powers of the immunologist to the utmost.

The old problem of the site of origin of yellow fever has now been solved by the use of the mouse protection test, by which it is possible to determine whether or not any individual has previously been infected with the virus. In this way it has been

shown that tropical Africa, with the exception of the eastern seaboard, is a vast reservoir of the virus. A high proportion of the natives have been infected, mostly in childhood, and usually with only insignificant symptoms. The resistance of the African negro to yellow fever has been known since the days of the slave trade, and taken with the recent objective evidence, it allows us to be certain that Africa is the indigenous home of yellow fever.

The Ecological Outlook on Infectious Disease.

Ecology as a science is itself very much a product of the last twenty-five years, and the subject matter and working principles of animal ecology are perhaps rather unfamiliar to the average medical reader. The science has really grown up from the old amateur "natural history", and like it deals with the activity of living organisms in relation to their environment. Its practical aspects are largely concerned with the determination of the causes for the variation in the numbers of animals from time to time and from place to place. Typical problems are the forecasting of the likely yield of furs from trappers in Canada, or the estimation of how many whales can be killed each season in the Antarctic without extinction of the species. These concern species of economic value, while on the other side of the picture there are the problems of dealing with the causes of undue prevalence of economically harmful species—rabbits, sparrows, locusts, liver-flukes and a host of others.

In a great many instances it is found that although a large number of environmental factors influence the numbers of a species, in practice the large and important fluctuations are usually determined by one or two circumstances only. In many small rodent species, for instance, there is a regular three, four or five year cycle of abundance. Numbers increase year by year until a certain density of population is attained. Then the food supply begins to grow scarce and the increased crowding provides specially favourable opportunities for any infection or parasitic infestation to spread from animal to animal. Rather suddenly the cycle ends when the combined effect of lack of food, the onslaught of predatory enemies and the rapid spread of infectious disease together reduce the numbers to a small fraction of those at the peak. This type of cycle, of which the natural history of Scandinavian lemmings is the classical instance, is characteristic in showing the interaction of four major factors: (i) population pressure, that is the tendency of any organism to increase in numbers at a rate that will sooner or later produce numbers too large for the environment to support; (ii) the available food supply; (iii) the activity of predators; and (iv) the activity of parasites. The last becomes particularly effective when the population density increases.

Factors of the same general character are involved in the survival of every type of living organism from man to the smallest virus, and in the opinion of many epidemiologists an application of the ecological point of view to infectious disease is a necessary preliminary to a satisfactory understanding of the problems of epidemiology. Perhaps the simplest way to present this point of view is to concentrate on the way in which an infective agent is able to survive as a species rather than on its activity as a pathogen.

An appropriate example is psittacosis. The nature of this disease has been recognized only within the last ten years, and the subject therefore falls well into the period under consideration. Further, it is a disease of particular interest to Australians, as there is little doubt that in our wild Australian parrots we have the largest reservoir of the disease in the world.

Psittacosis has been cursorily mentioned in text books of medicine for many years, and was assumed to be due to infection by a bacillus related to the paratyphoid group. It became of serious medical and popular interest for the first time in 1929 and 1930, when rather large numbers of people in Europe and America were infected; the mortality was in the vicinity of 20% to 30%. Investigations by modern methods showed very soon that the cause was not a bacterium, but an organism which is technically a virus, though considerably larger than most members of that group. The cases amongst humans at this time could nearly all be traced directly to sick parrots recently imported from South America, and it was tacitly assumed that psittacosis was an acute and rare exotic disease of parrots and that there was no danger of infection from home-bred birds. It was soon found, however, that this was not the case. Both in America and Germany many cases of psittacosis continued to appear after 1930, and nearly all of these patients were found to have been infected from aviary-bred budgerigars. It took a careful survey of Californian aviaries by Meyer and his collaborators to elucidate the position. He found that psittacosis was rife amongst the Californian budgerigars, sometimes in acute form, more often as an almost latent infection, killing only a few young birds. The budgerigar is a native of Australia, and it was therefore natural to look for evidence in regard to the occurrence of the virus in this country. It was somewhat disconcerting to find that psittacosis was as common amongst several of our wild parrots and cockatoos as it was in the Californian aviaries. The position seems to be that psittacosis is a long-established enzootic disease of Australian parrots, which, like most such diseases, produces as a rule few symptoms and almost no mortality. The virus and the host have developed a relation of mutual tolerance which allows the survival of both their species. The young parrots are infected in the nest from their parents and suffer a mild illness from which they have recovered by the time they are ready to fly. The virus remains present but relatively inactive in spleen and kidney, and may be excreted in infective form for at least a long enough period to allow infection of the following year's nestlings. Such a sequence may be regarded as the standard cycle by which both the psittacosis virus and its various host species have been able to survive for centuries. But like all such biological equilibria between host and parasite or between a carnivorous species and its prey, the balance may be readily upset in one direction or another. If, for any reason, the host's resistance to infection is weakened or the virulence of the virus raised, then manifest disease will appear. Last year some such change took place

to upset the parrot-psittacosis virus equilibrium, and extensive fatal epizootics occurred in the south-eastern States. Such a breakdown in equilibrium does not, however, favour the survival of psittacosis virus as a species: a bird dead from psittacosis has no opportunity of passing on the infection, and the virus in its tissues can have no descendants. Unduly active strains may cause a widespread mortality, but for this very reason they are less likely to survive than those of moderate virulence.

So far we have considered only the natural enzootic disease of parrots. Psittacosis of man is not a normal part of the life history of the psittacosis virus. Human infections are mere biological accidents, and the form taken by the disease is from the ecological point of view quite fortuitous. This holds just as well for all the human infections derived from enzootic animal diseases. Some are very mild (for example "Q" fever, which is a natural disease of Queensland bandicoots), or like psittacosis, produce serious illness only in old people; others, like plague or Rocky Mountain spotted fever, may be of extreme virulence. The lastnamed offers a particularly good example of the fortuitous character of the human infection. In one particular region of Montana, the Bitter Root Valley, especially one side of the valley, the infection is of extreme virulence, causing about 80% of deaths in unprotected subjects, while in other parts of the United States of America what appears by every laboratory test to be the same virus causes only mild illness in human beings.

There are many infections, however, which are confined in nature to the human host, or in which infection passing from one human being to another is the most important way by which the pathogenic microorganism survives. This group includes the majority of the important and also most of the trival human infections: malaria, syphilis, tuberculosis, diphtheria, influenza and measles may be named as examples due to widely different types of micro-organism.

Perhaps of all these specifically human diseases diphtheria has been that most intensively and effectively studied during the last quarter of a century. The essential discoveries that made such study possible belong to the previous period; they are the isolation and characterization of the diphtheria bacillus by Loeffler in 1884, Roux and Yersin's separation of a soluble toxin in 1888, the production of antitoxin by von Behring and Kitasato in 1890, and the development of a skin test for susceptibility to diphtheria by Schick in 1913. The application of this work to the study of the epidemiology of diphtheria, however, lies wholly within our period; and if Europe has supplied the basic data for the work it is the United States of America which have shown how it can be applied to eliminate diphtheria from any community enlightened enough to make the necessary effort.

As S. F. Dudley has frequently pointed out, the interaction between the two species, man and the diphtheria bacillus, constitutes a fascinating ecological problem; it is an interaction which to a very large extent goes on unseen, without manifest evidence of disease. Only the combined techniques of the practical epidemiologist, the throat swab and the Schick test, can make the real nature of the happenings evident. The "ideal" state of affairs—that is, a balanced equilibrium between the two species—is best seen in the tropics, where diphtheria as a disease is practically unknown. As judged by Schick tests children very early become infected in latent fashion and develop antitoxin in their blood, thereafter remaining immune, probably for life. In civilized communities in temperate climates the diphtheria bacillus finds more opportunity of producing severe infection; but the standard type of interaction between the two species is still the non-symptomatic infection with the development of immunity by the host. The typical history of a child in his relation to the diphtheria bacillus is probably somewhat as follows. He first meets the bacillus in early school days, a few organisms of low virulence lodging in his throat and producing only enough toxin to make a slight impression on his antibody-producing cells. With a few similar subsequent contacts this impression is reinforced and detectable antitoxin appears in the blood. With the development of antitoxin his Schick reaction, previously positive, becomes "negative", and from now onwards he is for all practical purposes immune to diphtheria. As Dudley has shown, virulent bacilli may lodge and multiply to some extent in his throat, but they will not produce clinical diphtheria. After his school period the child is less likely to come into contact with diphtheria bacilli, and his immunity may fade so that he again reacts to the Schick test. A basic immunity, however, will remain, which is sufficient to make the chance of his contracting diphtheria in adult life exceedingly small.

The less fortunate child becomes clinically infected by diphtheria bacilli before he has developed an antitoxic immunity. He may encounter a strain of high virulence, or receive a large dose by close contact with a diphtheria patient, or he may be predisposed to infection by otherwise harmless bacilli on account of general lack of resistance or some local lesion in the throat. The aim of preventive medicine is to place all children in the position of those who normally develop a subclinical immunity before meeting a virulent strain. Immunization by diphtheria toxoid in one or other form has provided a means of doing this which in practice has been shown to be completely adequate. The experience of several cities in Canada and the United States of America has been extremely gratifying. Both Toronto and Hamilton in Ontario have had several years in which not a single death from diphtheria has occurred. This conquest of diphtheria must be regarded as the greatest public health achievement of our period, and it is a grave reflection on the public health services of Australia and England that the application of the method in these countries is left to the sporadic activity of local authorities and individuals.

This outline of the way in which knowledge has developed about two typical infectious diseases, psittacosis and diphtheria, is typical of the whole field of infectious disease. Before measures for control can be adopted it is necessary to consider the activities of all the living organisms concerned;

sometimes only man and the pathogenic micro-organism, but often an animal host (bird or mammal) and one or more arthropod vectors must also be taken into account. In general, the aim of public health measures is to prevent infection, if this is a practical possibility, by quarantine measures, control of sanitation and the elimination of animal reservoirs or vectors of disease. The infections spread by the respiratory route cannot as yet be controlled in this way, and for these the two essentials are, first, the maintenance of good nutrition and general health, and, secondly, the imitation of the natural process of subclinical immunization wherever possible. There are hints that the next great advance in public health technique may be directed towards the prevention of respiratory infection; but there are many problems to be solved before this can become practicable.

"New Diseases."

With the steady development of bacteriological knowledge and new techniques for investigating the causes of disease, it is inevitable that new specific diseases will be isolated from the mass of undiagnosed fevers. As an example we may mention the recent work on "coastal fevers" in Queensland, which are now known to include scrub ("K") typhus, endemic murine typhus, leptospirosis and "Q" fever, all of them due to agents which have been first isolated during the past twenty-five years, but which undoubtedly have been producing infections for many years. There have, however, been several appearances of infectious disease whose symptoms were striking enough to make it certain that they had not previously been observed in the period over which reliable medical records are available. Most of these are infections of the central nervous system. *Encephalitis lethargica* appeared in eastern Europe in 1917 and spread over the world, reaching its peak about 1923, never involving very large numbers of individuals, but producing a considerable mortality and many distressing sequelæ. In 1917 and 1918 "X" disease, an acute encephalitis, made its appearance in the western part of New South Wales, and showed a slight recrudescence in 1925. A very similar disease caused a high mortality in Japan in 1924, and has reappeared periodically since; while in 1935 a curiously localized epidemic of encephalitis affected the city of St. Louis (United States of America) and its immediate neighbourhood. The viruses of the Japanese and American outbreaks have been isolated and studied. They are fairly closely related, and it is probable that the Australian "X" disease virus fell into the same group. *Encephalitis lethargica* still presents an unsolved problem. A virus is probably concerned, but no adequate proof of this ætiology has been given.

Perhaps in some way associated with the appearance of new encephalitic diseases have been the increased severity and frequency of epidemics of infantile paralysis in the last quarter of a century. The greatest of all such epidemics was that of 1916, in New York, and since then there have been other serious outbreaks in north-eastern America, California, Denmark and New Zealand. The Australian epidemic of 1937-1938 was the most serious that has yet involved this country.

An interesting example of what was apparently a new disease turning out on investigation to be an old one in new guise has recently been reported from the Faroë Islands in the North Atlantic. Since 1930 outbreaks of severe pneumonia have occurred each September, in some years involving up to fifty individuals and having a mortality rate of 20%. These infections have now been shown to be caused by the virus of psittacosis which is carried by fulmar petrels. The young petrels in the fledgling stage are collected for food in August, and infection occurs predominantly amongst those engaged in plucking the birds. The existence of enzootic psittacosis amongst sea birds of the northern hemisphere has been a complete surprise to epidemiologists, but is a good example of the continually changing situation in regard to infectious disease.

The Possibilities of the Future.

I have touched on some of the achievements of the last twenty-five years in the field of infectious disease; but from the point of view of someone reviewing the next quarter of a century it is probable that the things foreseeable but not yet accomplished in 1939 may be of equal or greater interest. The chemotherapy of bacterial disease is a newly opened field; sulphanilamide and sulphapyridine have already become standard treatments for several bacterial diseases, and we can hopefully expect even more effective drugs in the future. What effect will the general use of such remedies have on the epidemiology of bacterial diseases? At the present time gonorrhœa is the only bacterial disease whose incidence is likely to be appreciably influenced. The rapidity with which the male patient can be rendered non-infective, the much higher proportion of final cures and the less irksome nature of the treatment can hardly fail to slow down the spread of infection. If the promise of being able to render female patients non-infective is also fulfilled we can hope that gonorrhœa will cease to remain at its present obstinately high and constant level, and perhaps even look forward to its ultimate elimination.

Whooping cough and scarlet fever have not yet found their specific remedies, but these can hardly fail to materialize eventually. It is more problematical whether virus diseases will ever be susceptible to chemotherapeutic attack. There are theoretical reasons for the belief that variations on the sulphanilamide theme will not be effective in their case, and the discovery of suitable chemotherapeutic agents may have to wait for another fortunate accident.

If chemotherapy advances as it has in the last three years an important change can be envisaged in the epidemiologists' attitude toward the infections spread by the respiratory route. In the past there has been no serious attempt to prevent their spread, both because of the technical difficulty of so doing, and because of fear that in the absence of clinical and subclinical immunization a highly susceptible population might develop and be badly stricken whenever unusual circumstances resulted in a breakdown in the technique of prevention. Even at the present time there are technical methods available

which would greatly diminish the tendency to droplet infection occurring in schools, places of entertainment and so on. If with adequate chemotherapeutic agents we could be sure of controlling infections in non-immune persons, it might become a matter of practical politics to attempt with the aid of architects, engineers and chemists to stamp out respiratory infections. Pure water supplies and satisfactory sewage disposal have eliminated the danger of typhoid fever and cholera from civilized communities; it will at least end this survey on an optimistic note to contemplate a day when, thanks perhaps to the development of air-conditioning, colds, influenza, measles and tuberculosis will be as much a blot on a community's civic pride as an outbreak of typhoid fever is today.

Reviews.

THEME AND VARIATIONS.

"THUS we are men and we know not how: there is something in us that can be without us, and will be after us; though it is strange that it hath no history what it was before us." With these words Sir Walter Langdon-Brown, sometime Professor of Physic in the University of Cambridge, closes the introduction to his remarkable and fascinating book "Thus We Are Men".[1] This volume is a collection of addresses, delivered before different audiences, and now altered where necessary so that they may appear as what the author calls a theme and variations. The theme he states shortly as follows: "As we are animals we conform to biological laws. Our further evolution physically is improbable and mentally unlikely. Therefore only a psychological evolution remains. This necessitates co-operation, not merely instinctive as with the bees and ants, but intelligent and voluntary . . . To develop psychologically we must understand ourselves, and it should help us to do so if we can find ways to investigate those hidden depths in our minds from which we draw our impulses." The several chapters which are variations on this theme are divided, perhaps somewhat arbitrarily, into three sections. Though the chapters have a certain logical sequence, each may be regarded as a separate entity and appreciated as such; but the reader who would derive most enjoyment and profit from them will keep in mind the author's central theme.

The opening chapter, "The Biology of Social Life", is perhaps the most important. This essay was published in *The Journal of Mental Science* and was the basis of a leading article in this journal on September 11, 1937. The author refers to the law of the more complex and special development at the cost of the more simple and general. He analyses some of the defects inherent in that process and adds: "'The fault, dear Brutus, is in ourselves' rather than in a malignant fate, obscurely moving behind the scenes. Can we not hope that by remorselessly stripping off the labels from outworn symbols, by resolutely adopting reality principles, we may before it is too late realize the latent possibilities in human life, and recognize that the springs of happiness come from within? In the willing co-operation of free individuals for the common weal lies the only solution." Evolution always offers both a higher and a lower road; and when the organism is confronted by a changing environment the inexorable sentence of evolution is always "modify or disappear". This surely has a bearing on medicine and the community today. Medicine, by the conscious direction of its own evolution, can, if it will, take the higher road, lest by compulsion it is forced to take the lower, and, maybe, lose its soul in the process. "Reason is the judge and assessor of our instincts and our emotions which, however necessary for driving energy, if uncontrolled are but blind leaders of the blind. We have reason by which to think . . ." Perhaps we may take heart, for our author believes that in spite of the stumbling blocks in its path, the trend of twentieth century medicine is towards a revival of the best features of Greek ideals.

In the second section of the book the author probes the writings of certain other authors and tries to interpret them as the workings of the subconscious mind. He quotes Lenormand, who held that the work of art was only a discharge of the unconscious obsessions of the artist, that it was unlikely that the artist would ever commit the deeds of his characters, and that the writer exorcised his demons in describing them. Langdon-Brown will not accept this as the whole truth, though he sees an element of truth in it. He admits, however, that it does explain the violent contrast often found between the artist and the art he creates. He claims for the greatest art that it embodies so much of the universal mind, that the beholder finds in it the reflection of something in his own mind. For the physiologist imaginative works of art spring from a failure of conditioned reflexes to achieve their purpose, and for the psychologist they often express internal conflict. "They are a house of defence." The author compares a machine and a man. The more complicated a machine is, the more completely can it be arrested by a trivial defect; a man, on the other hand, confronted by obstacles which may appear overwhelming and crushing to the outsider, can turn them to advantage and make something fine out of his difficulties. "The satisfied man is not likely to be an artist." The first chapter in this second section is "Myth, Phantasy and *Mary Rose*". Here, in a fashion which alone will give the book an appeal to the literary-minded, the author discusses Barrie's work, his mother fixation and his employment of primitive imagery. A chapter is devoted to Robert Bridges, "the poet of evolution". Robert Bridges wished his poetry to express the philosophy of life which he acquired from natural science in general and from medicine in particular. No one, the author thinks, could have written "The Testament of Beauty" unless he had had a biological training and possibly also unless he had medical knowledge. The whole plan is to the author a wonderful exposition of the direction in which he finds that a good many minds are set today—"a sense, however shadowy, of what the next stage in evolution will be". Other chapters in this section are: "Sir William Osler", "The Psychology of Authorship", "Dr. Jekyll Diagnoses Mr. Hyde" and "The Background to Harvey".

The chapters in the third and last section are more varied than those in the two preceding sections. In the first sentence of "Some Gods and Their Makers" the author quotes Samuel Butler's inversion of Pope's aphorism, "An honest God is the noblest work of man". This, he states, is not a paradox but a profound truth. "To a large extent every nation has the God it deserves. The kind of God a man desires tells us much of what he is—but tells us even more of what he will become." The author in his introduction states that those who regard religion as revealed will frankly disapprove of this chapter, and that those who regard it as mere superstition will disagree with his conclusions. He wrote it, however, chiefly to clarify his own impressions for himself. At the end of the chapter he quotes Professor Alexander writing in the *Hibbert Journal* a passage concluding: "God's deity is thus the new quality of the universe which emerges in its

[1] "Thus We Are Men", by W. Langdon-Brown, M.A., M.D., F.R.C.P.; 1938. London: Kegan Paul, Trench, Trubner and Company Limited. Demy 8vo, pp. 354. Price: 10s. 6d. net.

forward movement in time." Whether readers agree with the author's arguments or not, they will find this chapter stimulating. In a chapter on the evolution of Italian art the author tries to show that the processes of growth and decay are as inevitable for the creations of the human mind as they are for man himself. In the chapter on the evolution of death the author is at his best. "Death has been evolved for the good of the race, to remove worn-out structures in favour of more attractive ones. And death being thus merely the servant of life, life ultimately attains mastery over death." The book closes with retrospect and with the words: "It is well to be able to say, 'The life to which I belong uses me, and will pass beyond me and I am content'."

This book is a rare intellectual feast. It reveals the author as a man of culture and erudition, a man of wide sympathies and of deep understanding. His knowledge of literature is profound, and even if now and then he is guilty of platitude, he sometimes admits his guilt with disarming candour. Thinkers of his calibre are needed today, when the political, professional and social worlds are topsy-turvy, and when devotion to an ideal, the striving for the higher psychological evolution of the "theme", is more necessary than it has ever been before. The members of the medical profession throughout the English-speaking world owe much to Sir Walter Langdon-Brown; this, his latest offering, will be read with appreciation and interest, and, we hope, by many Australian practitioners.

Congratulatory Messages from Overseas.

The following messages of congratulation have been received from overseas by the Editor.

SIR KAYE LE FLEMING, Chairman of Council, British Medical Association, writes:

On the occasion of the Jubilee Number of your Journal I send you most hearty congratulations both on my own behalf and for the Council of the Association. In an association of doctors scattered far and wide the Journal is the vital link that makes membership a real force and its Editor must carry a heavy responsibility. Since our visit in 1935 we have kept in close touch with your difficulties. In the anxious times ahead of the profession in Australia your Journal must play a leading part, and, with all confidence, I wish you every success in the future.

DR. N. GERALD HORNER, Editor of *The British Medical Journal*, writes:

I well remember the important decision taken by the Federal Committee of the Australian Branches of the British Medical Association in 1913 which brought about the fusion of two existing periodicals and the establishment of THE MEDICAL JOURNAL OF AUSTRALIA. Since then my colleagues and I have watched the progress of THE MEDICAL JOURNAL OF AUSTRALIA with friendly and appreciative eyes. In 1921 I had the opportunity of meeting Dr. R. H. Todd, and in later years your Chairman of Directors, Dr. T. W. Lipscomb, and these personal contacts with your office were followed by many agreeable talks with your Editor here in 1938 on matters concerning the work done by both journals, THE MEDICAL JOURNAL OF AUSTRALIA in Sydney and *The British Medical Journal* in London.

THE MEDICAL JOURNAL OF AUSTRALIA has achieved much during the past 25 years. It has gone from strength to strength. I send congratulations on behalf of the Editorial Department of *The British Medical Journal*, which looks forward to celebrating its centenary in 1940. It is a privilege to write a message for your Silver Jubilee Number, and I wish the journal many further years of service to the medical profession.

DR. E. C. MORLAND, Editor of *The Lancet*, writes:

Medicine is a great calling and the last 25 years have seen it taking an ever-larger place in the life of the community. In Australia you have founded colleges of surgeons and physicians, you have inaugurated a medical research council, and you have had proposals for a national scheme of health insurance. THE MEDICAL JOURNAL OF AUSTRALIA has been no passing spectator of these happenings; it has played its part in the advancement of medical science and the application of that science to daily life. You in Australia have created the kind of journal that we in England have inherited; and we must express our admiration as well as our very good wishes.

DR. MORRIS FISHBEIN, Editor of *The Journal of the American Medical Association*, writes:

My sincere congratulations on twenty-five years of publication of THE MEDICAL JOURNAL OF AUSTRALIA. By means of the printed word medicine throughout the world has been unified. If all of man's affairs could only have the inspiration that dominates scientific medicine, this would be a far better world in which to live.

May the coming years be kind to you.

DR. A. G. NICHOLLS, Editor of *The Canadian Medical Association Journal*, writes:

THE MEDICAL JOURNAL OF AUSTRALIA is celebrating the twenty-fifth anniversary of its birth next July. *The Canadian Medical Association Journal* desires to associate itself with this important event and to wish its eminent contemporary "Many Happy Returns of the Day". Canada and Australia are far apart—separated by the thickness of a sphere—but yet there are other considerations which do much to nullify the geographical handicap. Our medical journals are in spirit one.

We were impelled to examine the first volume of THE MEDICAL JOURNAL OF AUSTRALIA, and on page nine we read this: "The first function of the Medical Journal of Australia is to record the progress of scientific medicine and to assist in rendering the practice of medicine in all its branches of the greatest benefit to the people of Australia." Reading "Canada" for "Australia", this high purpose is also the first function of *The Canadian Medical Association Journal*. Your journal is the organ of the Australian branches of the British Medical Association; our journal, while independent of the British Medical Association, is the organ of the English-speaking medical profession of Canada, and our Association is affiliated with the British body; His Majesty the King is Patron of both. Thus a common purpose, a common racial tie, and a common allegiance unite the Journals of Australia and Canada. Long may it be so!

Kindly accept our cordial greetings and best wishes on the occasion of your "Silver Jubilee".

DR. C. LOUIS LEIPOLDT, Editor of the *South African Medical Journal*, writes:

Twenty-five years of distinguished service to the medical profession is a record of which any journal may deservedly be proud. In sincerely congratulating THE MEDICAL JOURNAL OF AUSTRALIA upon the achievement of its Jubilee, will you allow me, both for myself and on behalf of my colleagues in South Africa, to express our cordial good wishes for the continued prosperity and success of your Journal, and the hope that it may long remain to voice the opinion, promote the interests, quicken the activities and maintain the solidarity of the medical profession in Australia that it has served so well for the past twenty-five years.

DR. J. O. MERCER, Editor of *The New Zealand Medical Journal*, writes:

Please accept the sincere congratulations of the New Zealand Branch of the British Medical Association on your completion of twenty-five years of publication.

In New Zealand we feel that THE MEDICAL JOURNAL OF AUSTRALIA maintains a uniform standard of excellence which is in the best traditions of medical journalism. As the mouthpiece of the profession in the Commonwealth it preserves the balance between the medico-political sphere and scientific medicine with skill and discretion, while the clinical material is invariably stimulating and informative.

Your Journal is widely read by medical men in this country, particularly because the problems discussed are, in many instances, common to Australia and New Zealand. Many of your contributors are personally known here and their opinions are highly respected and widely disseminated.

It gives us great pleasure to express our indebtedness to your valuable Journal and to wish you continued success in future years.

SIR ARTHUR MACNALTY, Chief Medical Officer of the Ministry of Health and of the Board of Education, Great Britain, writes:

I have learned with pleasure that THE MEDICAL JOURNAL OF AUSTRALIA has successfully reached its Silver Jubilee. Though still comparatively young the Journal has, by the excellence of its articles and information, secured for itself a recognized place in the medical literature of a great continent, and I hope it will develop from strength to strength.

I wish the Journal every possible success in its future endeavours.

DR. THOMAS PARRAN, Surgeon-General, United States Public Health Service, Washington, writes:

On the occasion of its Silver Jubilee, permit me to extend my good wishes for the continuance of THE MEDICAL JOURNAL OF AUSTRALIA. The publication has been included in the reference library of the United States Public Health Service since 1920. Our use of its material in condensed form in the current issue of the *Health Officer* testifies to the fact that we regard it as an important medium for keeping public health workers in the United States informed concerning medical progress and procedures in the Antipodes.

I am glad to avail myself of the opportunity to proffer my congratulations on the attainment of twenty-five years in print and to express the hope that THE MEDICAL JOURNAL OF AUSTRALIA will continue to come to us for many years in the future.

The Medical Journal of Australia

SATURDAY, JULY 1, 1939.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

LOOKING BACKWARD AND LOOKING FORWARD.

AFTER twenty-five years since the inception of this journal it is natural that we should look back and recall the changes that have taken place in the world of medicine during that period, that we should remember some of our past difficulties and place on record the steps by which they have been overcome, that we should pay homage to the memory of those who gave freely of labour and devotion that this journal might be born and continue its development, that we should take stock of the present and look with hope and resolution into the future. The early days were not auspicious. The first issue of THE MEDICAL JOURNAL OF AUSTRALIA made its appearance on July 4, 1914, and war was declared exactly a month later. The event was sufficient to daunt the courage of the most intrepid. For many months the newly-formed Australasian Medical Publishing Company, Limited, under its Chairman of Directors, William Henry Crago, and its far-seeing Secretary, Robert Henry Todd, had been making its plans and completing its arrangements; and Henry William Armit had been brought from England to take the editorship. But these men and those associated with them knew that the foundations of the venture were securely laid; they had confidence in the goodwill and support of the Branches of the British Medical Association in Australia, and they were not disappointed. In a special supplement we reproduce, as a tribute to their memory, the pictures of the late Robert Henry Todd, first Secretary of the Australasian Medical Publishing Company, Limited, and its founder, who was largely responsible for the drafting of its memorandum and articles of association; the late William Henry Crago, first Chairman of Directors; the late Henry William Armit, first Editor of THE MEDICAL JOURNAL OF AUSTRALIA; and the late William Nathaniel Robertson, second Chairman of Directors. It is also fitting that we should once more record the indebtedness of the medical profession in Australia to the Victorian and New South Wales Branches of the British Medical Association, which, in order to achieve unity of medical endeavour in the Commonwealth, handed over to the new company their respective journals, *The Australian Medical Journal* and *The Australasian Medical Gazette*. Without this public-spirited action the establishment of one medical journal to serve all the Australian Branches would have been impossible. In this regard attention must be drawn to the history of medical journalism in Australia, from the pen of Dr. J. H. L. Cumpston, published on page 1, and reprinted from the first issue of this journal. Dr. Cumpston shows how medical journalism developed in this continent up to the time when *The Australian Medical Journal* and *The Australasian Medical Gazette* were firmly established in their respective spheres.

THE MEDICAL JOURNAL OF AUSTRALIA was thus fathered by unity wedded to optimism; it was a lusty infant, though, as already stated, its post-natal environment soon made its upbringing and development extremely difficult. The story of its growth is told elsewhere in this issue. Its purpose in life was carefully planned. In the leading article of July 4, 1914, we read that its functions are to record the progress of scientific medicine, and to assist in rendering the practice of medicine in all its branches

of the greatest benefit to the people of Australia. Like the British Medical Association whose members it tries to serve, its first object is scientific. This object has been consistently sought throughout the twenty-five years of its existence, and emphasis has always been laid on the responsibility of Australian medical practitioners in the prevention of disease and in their service to the public in all matters affecting the health of the community. To paraphrase a sentence in the foreword of *The Sydney Morning Herald's* centenary volume, "A Century of Journalism": Such a continuity of principle is something more than an equipment of medical and social opinions; it is a mental atmosphere, an attitude towards life. It is not for us to say whether the journal has succeeded in its objects, but we can assert that the will to attain them has always been uppermost. Our readers must be the judges, and they must remember that after all the attainment of these objects is impossible without the cooperation of the members of the British Medical Association in Australia.

Since 1914 the whole face of medicine has changed in remarkable degree, and the outlook of medical practitioners has necessarily changed with it. These changes have been well described by the five authors who have been good enough to contribute to this issue articles on subjects about which they are particularly well qualified to write. To Sir Charles Blackburn, Sir Henry Newland, Dr. F. S. Hone, Dr. Charles Kellaway and Dr. F. M. Burnet we express our thanks and appreciation. We commend these articles to the careful consideration of readers. They not only show the trend of present-day medicine in its modern developments, but they also show that medical practitioners nowadays pay increasing attention to the discovery of the cause of disease, that a study of the basic sciences is necessary to the understanding of almost every subject in medicine, and that prevention is or should be the first care of every practitioner. It is a commonplace that today is a day of specialism, and in medicine the term specialist is applied to those who confine their attention to particular branches of medical science. It is perhaps well, however, to remember that all medical practitioners are specialists in relation to the community, and that their attitude to the medicine of today is that of specialists seeking the welfare of society. In another twenty-five years medical science will doubtless have advanced to bounds undreamed of today, and others will be writing of the changed outlook in medicine; but the role of the medical practitioner in relation to society and the prevention and curing of its ills will not change; he is a specialist for all time.

And what of the future and its tasks? The future, as Samuel Johnson said, is purchased by the present. The future of this journal depends on the understanding and cooperation of the members of the British Medical Association in Australia—understanding of its aims and objectives and a willingness to help in their achievement. Cowper wrote: "Did charity prevail, the press would prove a vehicle of virtue, truth and love." Saint Paul extolled charity as the greatest of the three cardinal virtues—without charity we are as "sounding brass or a tinkling cymbal". The plea is charity. Were charity the activating enzyme of interprofessional relationships in Australian medicine, nothing could bar its progress, and the medical Press of the Commonwealth would increase its worth and extend its usefulness. But if we look beyond Australian medicine and our own journal jubilee at the future of medicine in general, we realize at once that the conquests of medicine, preen ourselves about them though we may, pale almost into insignificance before the vastness of the fields yet be won. In the last twenty-five years we have seen great happenings in medicine, but we must not be content. No one can tell where discovery will lead us, in what strange and unexpected places we may find ourselves. The task is to seek the truth. Wunderlich (quoted by Garrison) wrote:

> The future work of medicine lies neither in exclusively physical nor chemical investigation, nor in the shaping of neuropathology nor in hematology, nor cytology, nor in super-subtle diagnosis, nor in the rehabilitation or rediscovery of therapeutic principles. The future aim of medicine is that of any other science and identical with that of medicine at all times: it is the task of seeking and finding the truth, whatever and wherever it is and by whatsoever ways it may be found.

Progress will depend, as Carrel has stated, on observation of the sick, on meditation and experi-

mentation in the laboratory, and finally on the unveiling beyond the proscenium of chemical structures, of the organismal and mental mysteries. In this, as in every other human endeavour, history will help us, for we have always before us as ensamples the giants of bygone medicine. We may conclude with the words of William Osler:

> There remains for us, Greater Britons of whatsoever land, the bounden duty to cherish the best traditions of our fathers, and particularly of the men who gave to British medicine its most distinctive features, of the men, too, who found for us the light and liberty of Greek thought—Linacre, Harvey and Sydenham, those ancient founts of inspiration and models for all time in Literature, Science and Practice.

Current Comment.

THE ESTIMATION OF THE SEVERITY OF DIABETIC COMA.

"MEDICINE in general is, though very slowly, becoming quantitative." This remark is made by I. M. Rabinowitch, A. F. Fowler and E. H. Bensley in discussing diabetic coma, and attempting to evolve some system by which its severity can be assessed.[1] Once thought to be inevitably fatal, diabetic coma was found after the introduction of insulin not to carry with it an inexorable doom; but after the first successes were gained it was found that not infrequently sufferers from coma still died. Further, and it was with almost hurt surprise that this was realized, it was discovered that the blood sugar could resume a normal level, that ketosis could disappear and yet death might occur. The physician had meanwhile observed by simple clinical methods that the degree to which the patient's consciousness was lost or at least disturbed, was one fairly accurate measure of prognosis. Dehydration also was realized to be of serious import, and so gradually a more accurate series of pictures has been sketched in until now we cannot form any true idea of what is meant by the words diabetic coma used without some qualification. "Precoma" has been used a good deal to describe the state of impending coma, and the general impression is that whereas sufferers from precoma should recover, those in deep coma will die. What of those in intermediate states? Cynics will ask if these refinements in description matter at all, for the position might seem to be comparable to that of a disease such as pneumonia, in which some should recover with any reasonable care, others will die in spite of all endeavour, and the fate of the remainder may depend in part upon the skill with which they are handled. But the real point is that unless statistics are comparable, all published figures are of little use, and therefore the true worth of treatment cannot be assessed.

[1] *Annals of Internal Medicine*, March, 1939.

Rabinowitch and his co-workers lay great stress on the need for a standard for description of cases of coma. They discuss in some detail the variable factors which may affect the issue in diabetic coma and which will therefore affect also the interpretation of the mortality. These include: (*a*) clinical criteria for the diagnosis of coma, (*b*) the level of the carbon dioxide combining power of the plasma, (*c*) age, (*d*) the duration of coma, (*e*) the degree of loss of consciousness, (*f*) the blood pressure, (*g*) the degrees of renal impairment, and (*h*) other associated conditions or complications which may of themselves cause death. Some of these factors are worth special consideration. Age speaks for itself; it is an obvious advantage to be young. The duration of coma is also of evident importance, for it has been found that a duration over twenty-four hours practically doubles the mortality. The degree of unconsciousness, as mentioned above, is also of great importance. In the Montreal clinic it was found that complete and deep unconsciousness meant certain death. The importance of nitrogen retention is also well known. Some interesting observations are made concerning the estimation of the carbon dioxide combining power. These authors point out that the Boston clinic regarded all cases of diabetic acidosis in which the carbon dioxide combining power had fallen below 20% as being cases of diabetic coma; but they consider this as a very unsatisfactory criterion. They remark that the carbon dioxide combining power of the plasma cannot now be regarded as an infallible index of the degree of depletion of alkali, because discrepancies occur between the amount of excretion of ketones in the urine and the degree of reduction of bicarbonate in the plasma. The level of the carbon dioxide combining power depends to a considerable extent upon the condition which precipitated the coma. It is usually low where acidosis is the chief factor, but when some associated condition is of prime importance, such as infection, coma may occur even when the calculated combining power of carbon dioxide in the plasma is well over 20%.

Using all the variable factors in a more or less arbitrary fashion, Rabinowitch, Fowler and Bensley have devised a "severity index". In calculating this they "give marks" for age, duration of coma, degree of unconsciousness, presence of coffee-ground vomit or of infection, height of the systolic blood pressure, carbon dioxide combining power, the level of the blood urea nitrogen and the presence of any associated condition. The total thus arrived at gives an accurate measure of the degree of severity in any case. The underlying idea is a sound one, namely, the encouragement of clear thinking and accurate description of a condition which is often loosely labelled as diabetic coma without qualification, though it is likely that, human nature being what it is, every chief, and perhaps even every junior, in a diabetic clinic will set about devising a modification of this index which will be much superior. It is perhaps unnecessary to close by referring to so elementary a principle as the need for prophylaxis

and early diagnosis. But diabetic coma, in spite of insulin and efficient clinics, still occurs, and still kills a certain and not inconsiderable number of patients. If an earnest consideration of the vast difference lying between the patient suffering from threatened coma and the patient with declared coma results in a lessening of those in the latter category, great good will have been accomplished.

THE VALUE OF PRESERVED CITRATED BLOOD FOR TRANSFUSION.

THE preservation of citrated blood for purposes of transfusion has been given considerable prominence in literature lately, and there seems little doubt that lives have been saved by the prompt use of blood thus ready to hand. Even with all the elaborate mechanism of blood donors' clubs and the like, it is not invariably a simple matter to obtain an adequate volume of compatible blood in emergency, especially in extra-urban areas. But careful inquiry has been made into the suitability of citrated blood from "banks" for various purposes, and a distinction must be drawn between the value of such blood when used for the restoration of blood volume reduced by severe hæmorrhage or shock and its value in the treatment of anæmia or microbic infection. In anæmia transfused blood is of little value unless the red cells can efficiently carry out their respiratory function; in thrombocytopenic purpura the platelets and other coagulating principles must be well preserved for a transfusion to do good, and in cases of systemic infection the patient may need complement, antibodies of various kinds and perhaps also such other help as may be given by the leucocytes of fresh blood. These considerations are set out clearly by J. A. Kolmer in an article on the subject.[1] Incidentally he believes that the value of transfusions in severe infections is not merely the relief of a secondary anæmia, but rather the augmentation of the immunizing mechanism of the body which suffers so severe a strain in violent infections. The value of the complement supplies of fresh serum or blood has been extolled by a number of writers, and in addition to this non-specific factor there are the other specific factors which may be available in certain cases, as when the donor has recently convalesced from the infection in question or when he has been artificially immunized.

Kolmer records his investigations into the viability of complement. This subject has been extensively studied for a number of years, and there seems little doubt that, though sodium citrate diminishes the activity of human complement somewhat, citrated blood will retain its complement satisfactorily for two to three weeks if kept at 4° to 6° C. When the other protective properties of blood are examined, however, it is found that preservation of human blood does not guarantee the preservation of its bactericidal and phagocytic properties. The former dwindles after a week or two, and the latter is much reduced after a few days. At the end of a week the neutrophile leucocytes of citrated blood are practically devoid of phagocytic activity. Further, all the neutrophile cells do not survive equally well, for they steadily decrease in number, and evidences of disintegration and autolysis are seen as early as the second day after collection. Platelets are even more fragile and show degenerative changes almost immediately: after two days they are hard to find, and after five days they have virtually disappeared. Erythrocytes, in the metabolic sense, live less intensely than other blood cells; they subserve but one function, though this is of paramount importance. But even they share in the retrograde changes at an early stage, for after forty-eight hours swelling may be seen and evidence of loss of hæmoglobin, until after fourteen days, when at least 30% of the red cells have become fragile shadow forms. Thus it appears that the chief value of citrated blood "banks" is to have readily available supplies of blood which may be used for cases of severe traumatic hæmorrhage or shock. Here the chief need is to restore blood volume: salt solution is only of temporary value, and the addition of gum acacia, though supplying a correct osmotic balance and preventing a second rapid loss of fluid from the blood vessels, carries with it the risk of encasing the red corpuscles in a film which may impede their respiratory function. Nothing supplies this need of fluid so well as blood, and "bank" blood may do very well for the purpose. Its military importance has recently been demonstrated in Spain. But Kolmer's caution should be remembered, that for the treatment of anæmias, blood dyscrasias and infections, blood should not be used if it has been preserved more than two or three days. Like Tithonus, who found that the immortality conferred on him by the gods doomed him to a progressive incapacity, blood, even in its extracorporeal role as a life-saver, appears soon to outlive its usefulness.

[1] *The American Journal of the Medical Sciences*, April, 1939.

THE TOXICOLOGY OF THE THIOCYANATES.

APPARENTLY the first pharmacological investigations of the thiocyanates were made by Claude Bernard in 1857. Although they were known to produce toxic effects, W. Pauli, in 1903, advocated their employment in the reduction of high blood pressure. Owing to unfavourable manifestations following their use, they lost favour. K. Westphal, however, in 1925 again advised their use in hypertension. Since that time opinions have varied greatly as to their usefulness and safety. M. H. Wald, H. A. Lindberg and M. H. Barker, after ten years' experience with cyanate therapy, carefully controlled by determinations of the blood content of the drug, give a critical analysis of the literature on the subject of the toxicity of the drug, and make

suggestions regarding its therapeutic applications.[1] They insist on the importance of the relationship between thiocyanate toxicity and the actual amount of the electrolyte present in the patient's blood. The drug is stored in the body, being widely distributed in the body fluids and tissues. The toxic action is cumulative. The content of the thiocyanate in the blood is an index of the thiocyanate content of the tissues. It has been shown that the optimum "safe" level at which the blood cyanate content may be maintained is between 8 and 14 milligrammes (the level at which the hypotensive effect of the drug is fully effective). Accordingly determination of blood cyanate levels is the safest guide to dosage. In view of this fact, Wald and his associates divided the manifestations of thiocyanate toxicity into two groups. The first group contained the toxic manifestations seen in patients whose blood cyanate content was within "safe" limits, although therapeutically effective. The second group comprised the toxic manifestations noted in patients whose blood thiocyanate content exceeded those limits, namely, between 15 and 20 milligrammes per 100 cubic centimetres of blood or higher. In the experience of Wald and his colleagues the maintenance dose ranged from 0·3 gramme (5 grains) a week to 1·0 gramme (15 grains) a day, depending upon the patient's rate of excretion of the drug at a particular time. Weakness and fatigue are of such frequent occurrence that these authors scarcely look on them as toxic states. In most instances these symptoms disappear spontaneously from the second to the sixth week of therapy. In some cases it would appear that the fatigue complained of is the result of the hypotensive effect of the drug rather than a toxic manifestation of the thiocyanate itself. This accords with the well-known fact that, in hypertensive patients, reduction of the blood pressure by any means leads to fatigue and lethargy; with return of the pressure to its previous level the patient's well-being is regained. Aching and cramping of the calf muscles are often associated with transitory fatigue. It has been suggested that cramping in the extremities may be connected with a reduced circulation. Some observers have noted increased nervousness and irritability with the inception of cyanate therapy. Others have reported a sedative action by thiocyanates, and neurasthenia and neurosis have been ameliorated. Wald and his associates consider that patients receiving thiocyanates sleep better and are less irritable. They encountered toxic dermatitis only on six occasions; It was never serious and disappeared when the drug was discontinued. Occasionally there was seen a benign enlargement of the thyreoid gland, usually diffuse, and with a normal or slightly lowered metabolic rate. This appeared only after protracted exhibition of cyanate and with blood values constantly in the lower bracket. It decreased with administration of thyreoid gland. Mild gastro-intestinal disturbances were noted with the usual therapeutic levels of serum thiocyanate. Above the safe blood level nausea and vomiting are early evidences of thiocyanate toxicity. Severe diarrhœa may supervene. Cerebral manifestations after the use of potassium thiocyanate arise when the level has reached 20 milligrammes or more per 100 cubic centimetres of blood. Wald and his colleagues point out that this toxic manifestation must not be confused with the cerebral symptoms which may occur in an advanced senile arteriosclerotic patient as a result of hypotension and vascular insufficiency. They discuss critically the opinion that thiocyanates increase the frequency of anginal attacks or even initiate them, and they admit that, in a few cases, angina seemingly has developed as a direct result of the hypotensive effect of the drug. In rabbits a condition of hypoadrenia has followed the use of thiocyanates, but Wald and his associates could not reproduce it in dogs. Coma, convulsions and death may result from thiocyanate poisoning, and the possible explanation of these deaths is discussed.

An analysis is given of eight deaths recorded in the literature. C. F. Garvin records an additional fatality.[1] He estimates that the minimum lethal dose should be 15 to 30 grammes for a man weighing 70 kilograms (154 pounds). No characteristic anatomical changes have been discovered at autopsy. It is insisted upon by the various writers that there may be pronounced idiosyncrasy and intolerance to cyanates, which cannot be foretold. Further attention must always be paid to the possibility of chronic poisoning from their long-continued use.

[1] *The Journal of the American Medical Association*, March 25, 1939.

AN APPRECIATION.

THE Editor wishes to take this opportunity of thanking those friends of the journal overseas who have sent messages of congratulation in connexion with its silver jubilee. It is also fitting that he should at this time record his indebtedness to many medical practitioners and others throughout Australia without whose constant collaboration it would be impossible to produce abstracts of current medical literature and reviews of books. The journal is also indebted to those who assist in the writing of "Current Comment". Special mention must be made of the valuable services of the journal representatives in the several States: Dr. H. Boyd Graham in Melbourne, Dr. Joyce Stobo in Brisbane, Dr. E. F. Gartrell in Adelaide, Dr. Cyril Bryan in Perth, and Dr. William Crowther in Hobart. Lastly, the Editor would express his gratitude to every member of The Printing House staff who has a share in the production of the journal, and especially to the members of the type-setting, composing, reading, machining and binding departments, who make every effort to perfect their work, and who accept without murmur the occasional irregularities which are unavoidable in the production of a weekly journal.

[1] *Ibidem.*

Abstracts from Current Medical Literature.

OPHTHALMOLOGY.

The Phenolization of the Spheno-Palatine Ganglion in Ophthalmology.

ROBERT THUREL (*Archives d'Ophthalmologie*, June, 1938) suggests that the sensory neurones of the trigeminal nerve are responsible only for the lightning and intermittent pain of facial neuralgia usually provoked by touch or movement of the face. Destruction of the nerve causes such pain to disappear. Sensory disorders of the sympathetic system occur in crises of more or less prolonged duration. The pain reaches its maximum intensity little by little and passes off slowly. During the crisis it is continuous. In the intervals between the crises disagreeable sensations often persist, for example, formication, pricking, fibrillary twitching, burning, tightness, slackness, rhythmic pulsation with the heart beat. Burning or causalgia is considered the most characteristic symptom. There is no provocative cause. The symptoms are not exaggerated by movement or quietened by rest. These disorders can arise when there is anæsthesia due to destruction of the sensory root of the fifth nerve; and they are due to overaction of the sympathetic system. The author terms them sympathalgias in contradistinction to the neuralgias. He has applied to the facial sympathalgias the method which has succeeded perfectly in trigeminal neuralgia and which consists of destroying the nervous elements responsible for the pain. Curing the facial neuralgia by injection of alcohol into the trigeminal sensory nerve, the author has been led in facial sympathalgia to treat the cephalic sympathetic, and in particular the spheno-palatine ganglion, which is the most important and most accessible of the sympathetic ganglia of the head. He commenced by injection of the spheno-palatine ganglion with alcohol. This can be done with certainty by the posterior palatine canal, a 3·5-centimetre needle being used. By the subzygomatic route it is easy to be assured that the needle is in the right direction, penetrating at first by the spheno-palatine foramen into the nasal fossa. This can easily be verified by injection of some coloured fluid and by observation of the escape through the nose. It is only necessary then to withdraw the needle a little for the needle to be in contact with the spheno-palatine ganglion. The alcohol injection is not without danger. It is preferable in general practice to be content with application of tampons soaked in carbolic acid by the endonasal route opposite the spheno-palatine foramen in the nasal fossa behind the middle turbinal. It is very necessary to employ long sessions of from one-half to one hour and to replace the cotton plugs by freshly changed tampons. Carbolic acid applied in this way will destroy the pituitary mucous membrane and the nervous filaments which it contains, and in the end nothing hinders it from penetrating through the spheno-palatine foramen into the pterygo-maxillary fossa and reaching the spheno-palatine ganglion. The patient often complains during the treatment of numbing of the palate, of the gum and of the upper lip due to temporary involvement of the palatine and superior maxillary nerves which are found in the immediate neighbourhood of the spheno-palatine ganglion. Another proof of action on the spheno-palatine ganglion is given by recurrence of pain on first contact with the ganglion, and lastly by disappearance of the pain so provoked. At the second session the painful distant reflex is less intense and generally does not occur at the third session. Three sessions of one hour each, made at a few days' interval, are actually necessary for sufficient destruction of the spheno-palatine system. The therapeutic indications are: (1) Sympathalgias, which may be referred far from the source, for example, those of ocular origin may be diffused over the whole head; examples are: (*a*) episcleritis, iritis, chronic glaucoma, retrobulbar neuritis, migraine; (*b*) post-zosteric conditions, which may require Gasserian ganglion treatment also, as it too contains sympathetic fibres; (*c*) photophobia. (2) Neuroparalytic keratitis, in addition to tarsorrhaphy; recurrent corneal ulcer. (3) Episcleritis. (4) Subacute or chronic glaucoma. (5) Vasomotor and oculo-secretory crises associated with nasal crises. (6) Retinal artery spasm. (7) Optic neuritis.

The Paths and Centres for Conjugate Movements of the Eye.

G. E. JAYLE (*Archives d'Ophthalmologie*, July, 1938) reviews the classical anatomical teaching and schemata which have been built upon histological studies and experiments of stimulation and ablation of different areas of the cortex and brain stem in the lower animals, primates and especially in man. He then proceeds to estimate the relative part played in eye movements of a voluntary and of a reflex factor. Although a centre for voluntary conjugate movement has been localized at the base of the second frontal convolution, he shows that the voluntary factor associated with this centre is much less influential than that associated with the adjacent centres for voluntary movement of the muscles of the trunk and limbs. While destruction of the motor cortex of the ascending frontal convolution is accompanied by loss of voluntary movement of the limbs of the opposite side, destruction of the oculogyric frontal centre of one or even both sides of the brain may not be followed by paralysis of conjugate movement or by conjugate deviation of the eyes. It is evident that there is no identity between the control exercised by the centres of the frontal cortex over the conjugate movements of the eyes and those of the muscles of the body. On the contrary, the conjugate movements of the eyes conform much more closely with those automatic movements of adjustment, which in the case of the body muscles are governed by impulses originating in the labyrinth or are evoked by proprioceptive afferent impulses. Hence it is very difficult to effect voluntary movements of the eyes in an opposite sense when the head and eyes are constrained to one or other side, or up and down, as a result of visual or auditory stimuli. The tendency to automatic movement prevails over the voluntary control. Nevertheless in the conjugate movements of the eyes a certain degree of voluntary control exists and is capable of inhibiting the purely reflex action of the lower centres in the occipital cortex or the brain stem. Again a voluntary and non-purposive contraction of the eye muscles cannot be produced such as that which can be evoked in a somatic muscle or a group of muscles. Further, the conjugate movements of the eyes under the direction of the will are capable of a wider range than those evoked by labyrinthine stimuli; while again (contrasting the ocular movements of adjustment under labyrinthine stimuli) there is nothing in the response of the somatic muscles to proprioceptive stimuli similar to the quick phase of nystagmus in the eyes under labyrinthine stimuli. Lastly, there is something specific for each of the adjusting movements of rotation of the eyes according as they take place around an axis, vertical, transverse or sagittal, in response to movements communicated to the head in the three principal planes, being most marked around the vertical axis, less marked around the sagittal, and not perceptible around the transverse axis. The author concludes that there is specificity of the movements of rotation of the eyes in comparison with the movements of the somatic muscles—there is specificity of the rotatory movements of the eyes about the vertical axis as contrasted with movements about the other two axes.

Linear Pigmentation of the Cornea with Pterygium.

F. STOCKER (*Klinische Monatsblätter für Augenheilkunde*, Volume CII, page 384) announces his discovery of a pigmented line in the cornea in two patients with pterygium. He believes that this appearance has never before been described. His first patient, aged forty-seven years, presented a pterygium in the left eye involving about one-third of the diameter of the cornea. Adjacent to the head of the pterygium, but clearly separated from it, there was a narrow line consisting of a series of olive-

green and brown dots situated immediately under the corneal epithelium. The line was straight and not curved around the head of the pterygium, and occupied the middle third of the diameter of the cornea. The line disappeared after excision of the pterygium. His second patient, a male, aged forty-seven years, had had a pterygium successfully removed from his right eye a year previously. The left eye presented a broad pterygium with a broad head, occupying about one-quarter of the diameter of the cornea. There was a narrow yellowish-brown line in the cornea, composed of fine dots running parallel to the head of the pterygium. It was situated immediately under the corneal epithelium. These lines resemble Fleischer's ring in keratoconus and Stahli's line. Both eyes were astigmatic, with the axis at right angles to the direction of the pigmented line. The author believes that these lines occur only when the head of the pterygium is broad and when its pull is sufficient to rupture Bowman's membrane, and that pigmented dots then collect in the defect.

OTO-RHINO-LARYNGOLOGY.

Diagnosis and Treatment of Otogenic Meningitis.

SAMUEL J. KOPETZKY (*The American Journal of Surgery*, October, 1938), in a paper dealing with the diagnosis and treatment of otogenic meningitis, states that the particular bacteria invading the central nervous system play a relatively small role; the tissue reactions and the clinical signs are almost similar, irrespective of the nature and the kind of invading organism. Clinical signs include those due to increased intracranial pressure and those due to toxicity, including the terminal sepsis from bacterial activity. When the predominating symptoms are those of pressure, if this can be relieved, cure will not necessarily follow unless the other factors incidental to the lesion have been mastered. If the intracranial pressure is abated, time is gained to carry on measures to combat the other factors. If the intracranial pressure remains high and mounts, then death intervenes before the other factors in the case can be dealt with. Drainage of the central nervous system does not answer the problem presented in meningitis. The problem is more one of keeping the brain tissue alive to outlast the infection. To accomplish this it is important that the cerebro-spinal fluid should be kept circulating. The deposit of plastic exudate, which impedes cerebro-spinal circulation, is to be lessened to the greatest possible degree. This is best accomplished by the administration of small whole blood direct transfusions; these are begun as early as possible in the course of the disease and continued until all meningeal symptoms have disappeared. Chemotherapy, in the form of sulphanilamide, is of value. It may be given by mouth, injected intramuscularly or by both methods. During its administration repeated tests for methæmoglobin should be made. The dangers from the reactions to the drug are lessened when blood transfusions are given. No evidence is as yet at hand that medical treatment alone is sufficient. It is therefore absolutely necessary that every possible bone focus of infection be thoroughly removed as soon as its presence is diagnosed. The clinical picture alone is insufficient to furnish the clinician with specific diagnostic data; it may suffice for the making of a clinical diagnosis of otogenic meningitis, but an exact determination of the phase of any infection is highly desirable. This may be made by repeated and careful examination of the cerebro-spinal fluid.

Chemoprophylaxis against Impending Poliomyelitis.

REA E. ASHLEY (*Archives of Otolaryngology*, January, 1939) discusses the chemoprophylaxis against impending poliomyelitis. The organism of poliomyelitis is a small filter-passing virus, which is highly selective for nerve tissue and which progresses within the axis cylinders of the nerves. The olfactory nerve is the most logical and probably the only normal portal of entry. Serum and vaccines have failed to protect monkeys against the disease. Certain chemicals applied to the olfactory tracts of monkeys have rendered them resistant to infection with the virus after repeated intranasal instillation. Fifty or sixty chemicals have thus far been tested for this protective property; and while zinc sulphate is not toxic and seems to be the most effective found, it causes certain irritating and unpleasant symptoms and is not the ideal solution. Anosmia which develops after chemical treatment is probably an evidence of the completeness of the nerve blocking and an indication of the protection. The duration of the anosmia when zinc sulphate is used varies greatly in different persons, but apparently the sense of smell always returns. If this type of treatment is practised, the effectiveness of the protection will depend on the thoroughness of the nerve blocking. Functional tests for the return of the sense of smell should be the guide for further chemical application. The treatment can best be applied by the postural method described by Shahinian and Meyerson; it is simple and efficient, and by means of it treatment can be given quickly to large groups. While the experience during human epidemics has so far failed to give evidence of definite protection, further field tests are indicated, since previous methods of application have been faulty. Should this treatment prove effective in man, it will still be far from an ideal prophylactic, chiefly because of the short duration of the protection afforded and the failure of the method to produce in the individual any immunity to the virus. Nevertheless it is the only method which at present promises any hope of actually combating the disease.

Role of the Tonsils in Experimental Endocarditis.

IRA FRANK AND MARGERY BLAHD (*Archives of Otolaryngology*, March, 1939), in a study of the role played by the tonsils in experimental endocarditis, remind us that the advisability of removing the tonsils as a prophylactic measure for the various forms of endocarditis has long been a subject of controversy among clinicians. In two of thirty dogs, after intratonsillar injection of virulent β hæmolytic streptococci, acute endocarditis developed. The hæmolytic streptococci used had previously produced endocarditis in 40% of a series of twenty-five dogs. After repeated introduction of the same organism into the tonsillar bed and parapharyngeal regions endocarditis did not develop in any of fifteen dogs whose tonsils had been removed. Furthermore, repeated attempts at culture of the blood from the control dogs were without result. The authors suggest that the tonsils played a role in the development of bacteriæmia and endocarditis in these experiments; but they admit that the results of the investigations cannot be applied too readily to the patient. However, these studies present experimental confirmation of the favourable clinical results reported in the literature in respect to prophylactic tonsillectomy for endocarditis.

Abscess of the Brain.

BERNARD J. ALPERS (*Archives of Otolaryngology*, February, 1939) discusses the histological and clinical features of abscess of the brain. Twenty-seven abscesses have been studied histologically and bacteriologically. The histological structure is described, especially with reference to the formation of the capsule of the abscess. Time, the type of organism and the resistance of the host are the most important factors in the development of the capsule. The optimum time for capsule formation is three to four weeks.

Impacted Foreign Body in the Œsophagus.

MARVIN L. LATIMER (*Archives of Otolaryngology*, March, 1939) reports an unusual type of foreign body (radish), firmly impacted in the œsophagus, which could not be removed by the peroral route. To add to the difficulties of diagnosis and treatment, the patient was a mongol idiot, which eliminated subjective information and essential facts of the history. Death was due to a drowned lung, because of the obstruction of the œsophageal opening with an overflow into the trachea.

Australasian Medical Publishing Company, Limited.

THE HISTORY OF ITS DEVELOPMENT.

AT the third session of the Intercolonial Medical Congress, held in Sydney in 1892, a resolution was adopted that it was desirable to found an Australasian medical journal. Four years later, at the fourth session at Dunedin, Dr. (now Sir Louis) Barnett, one of the general secretaries, again advocated the establishment of one medical journal, which would serve the colonies of Australia and New Zealand. Australia and New Zealand had between them at that time three journals. *The Australasian Medical Gazette* was the property of the New South Wales Branch, having been acquired for the Branch from its proprietor, Mr. L. Bruck, by the generosity of some of the Branch members. This journal was the official organ of all the Branches of the British Medical Association in Australia except the Victorian Branch. The *Intercolonial Medical Journal of Australia*, which had been established that year by the amalgamation of the *Australian Medical Journal* and the *Intercolonial Quarterly Journal of Medicine and Surgery of Australasia*, was the official organ of the Victorian Branch. *The New Zealand Medical Journal*, the property of the New Zealand Branch, was published every quarter. The discussions proved abortive, but two facts emerge: first, that there was in 1896 a desire to have one medical journal which should serve the whole of Australia, or Australia and New Zealand together; secondly, that this desire could not be carried into effect unless some body were created which would unite the several colonies and give to the Branches of the British Medical Association equal rights and powers. One of the means by which it was suggested that unity might be brought about was the establishment of an Australian medical association; but this was strenuously opposed. This proposal was put forward again in 1902, but the majority of members refused to consider it.

Nothing further was done towards the establishment of one medical journal for Australia until the Federal Committee of the British Medical Association in Australia had been instituted. By this time the Commonwealth had been established; colonies had become States in one federated body and people were beginning to think federally. The leaders in the councils of the six Branches of the British Medical Association in Australia saw the difficulties, but determined that they should be overcome. The South Australian Branch took the initiative, and the late William Thornborough Hayward was its moving spirit. Machinery had to be created whereby the Australian Branches could take united action. Conspicuous amongst those who furthered the project and drew up the lines along which the new body was to be organized was the late Robert Henry Todd. Though there was no constitutional authority for the step, rules governing the powers and procedure of a central body were drafted and submitted to the Central Council of the British Medical Association in London. These were approved and the Federal Committee of the British Medical Association in Australia came into being.

The Printing House. (Photograph taken from the University of Sydney.)

In May, 1911, the newly formed Federal Committee sent to the Branches for their consideration and approval the following motions:

1. That in the opinion of this committee the Branches of the British Medical Association in Australia should conjointly own and conduct one weekly paper.

2. That in the opinion of this committee machinery should be provided for the Branches to combine to purchase the interests of New South Wales and Victoria in *The Australasian Medical Gazette* and the *Australian Medical Journal* respectively to conduct a weekly paper.

After negotiations between the Federal Committee and the New South Wales and the Victorian Branches of the British Medical Association the Australasian Medical Publishing Company, Limited, was formed. The memorandum and articles of association were largely the work of the late Robert Henry Todd, and the company was registered on June 12, 1913. Its objects, as set out in the memorandum and articles of association, are exceedingly wide and embrace every business activity which might conceivably be connected with a printing and publishing house. The objects were set out in this way so that the company would not be hampered in the future if its activities were extended. The constitution of the company is simple. It is a company limited by guarantee, that is, without shares. Each of the Branches of the British Medical Association in Australia has power to nominate three members of the company. The directorate is composed of one member representing each of the six Branches, with the exception of New South Wales; two of the New South Wales members of the company are directors. This arrangement was made because the company is operating in New South Wales and in order to secure continuity of direction. The original directors were: Dr. W. H. Crago (chairman), Dr. W. Kent Hughes, Dr. W. N. Robertson, Dr. F. S. Hone, the Honourable Dr. A. Saw and Dr. Gregory Sprott. The present board of directors consists of: Dr. T. W. Lipscomb (chairman), Dr. J. P. Major, Dr. D. Gifford Croll, Sir Henry Newland, Dr. D. D. Paton, Dr. Gregory Sprott and Dr. A. M. Davidson. Soon after its establishment the company issued debentures to members of the Branches of the British Medical Association in Australia, in order that money might be raised to defray the initial expenses.

Type-setting department, showing battery of four linotype machines and operators.

What has been called the first stage of the development of this journal began when the directors decided to let a contract for the printing of the journal to Shipping Newspapers Limited and to engage a whole-time editor and a whole-time manager. Dr. Henry William Armit was chosen as Editor. He came to Australia with a strong recommendation from the late Dawson Williams, then editor of *The British Medical Journal*. His journalistic training had been such that he was eminently suited to the starting of a new journal. He brought to the task great enthusiasm and tireless energy. He did not spare himself, and indeed it often appeared that his sole thought was for those who worked under his direction. To some he may at times have appeared "difficult"; but this was often because they could not see his objective as he saw it. Those who worked with him knew that the journal had first place in his mind and that it was his whole life. His love of accuracy was reflected in the pages of the journal; he would spend what appeared like endless time on finding the right initial of an author, or on the verification of some casually given reference. On one occasion, when he was twitted with being a pedant, he replied in typical fashion: "If by pedantry you mean a love of meticulous accuracy, I must plead guilty." It is interesting to look through the earlier volumes of this journal and to notice how Armit gradually brought the style of the journal, particularly from the typographical point of view, to the high standard that he eventually attained. This advance began to be noticeable when the type-setting first came under his supervision; and when type-setting, composing, machining and binding all came under his control, he revelled in his work. But this is to anticipate the story somewhat. At first Armit was editor only and the management was in the hands of a full-time manager. Before very long he was made both editor and manager. As we have already stated, the advent of war was a severe trial to the new company, chiefly owing to the enormous increase in the cost of paper.

The need for one medical journal for the whole of Australia became more evident during the War than it had been before. Australia, from being a collection of States, joined together under the title of Commonwealth, had become a nation; and it was necessary from the army medical point of view that there should be some medium which could circulate among the medical profession as a whole. When the officers of the Army Medical Corps returned to their practices after the War was ended they appreciated the one journal, for men from every State had by common service overseas been thrown together and had learned something of other medical schools than their own and had wanted to know more of the men about whom they had heard so much. It was unthinkable that the journal, started after such protracted negotiations and in such high hopes, should fail. Eventually it was resolved that the most economical way of dealing with the critical situation was to install a type-setting and composing plant and to have the machining done by a printing firm.

Composing department, showing composing surfaces (tables) and staff of compositors.

This has been described as the beginning of the second stage in the company's development.

A suite of offices on the fifth floor of the British Medical Association Building, at 30, Castlereagh Street, was leased and the plant was installed. The first issue of THE MEDICAL JOURNAL OF AUSTRALIA set up by the company's own plant was published on October 8, 1921. The linotype operator, the compositor and the apprentice who did this work came

from Shipping Newspapers Limited. The last two mentioned are still in the service of the company and are among the most valued members of its staff. This venture was successful from the start and it became possible gradually to ease the burden of the Editor-manager. For some years part-time assistant editors had given valuable service to the company—first of all Dr. J. P. Hastings, then Dr. H. G. Chapman, and for a short period Dr. A. W. Holmes à Court. In 1921 Dr. C. G. McDonald became half-time assistant editor; he was succeeded for a few weeks by Dr. W. Keith Inglis and the present Editor joined the staff as assistant early in April, 1922.

The staff at the Elizabeth Street offices consisted of the Editor, the assistant editor, the editors' secretary, a book-keeper, a linotype operator, a compositor and an apprentice. It was a happy coterie, but progress called for changes. The directors considered a proposal that the printing activities should be extended and that the company should acquire its own complete printing plant so that it might produce not only THE MEDICAL JOURNAL OF AUSTRALIA, but also other scientific periodicals and books. The scheme was examined by a firm of chartered accountants, who reported favourably upon it. Eventually the directors adopted the further suggestion that the company should own its own premises. The directors hoped by this means to be able to increase the size of the journal; the need for an increase in size was obvious, and with the existing plant no expansion was possible. After various vicissitudes the time for expansion was ripe, and the company entered upon the third stage of its development.

Money was raised by debentures which were taken up by members of the British Medical Association in all six Australian Branches. An allotment was made to each State, so that the financial interest of members should be as widely distributed as possible. It should be noted that this policy has been pursued ever since that time by the directors. When a debenture holder dies, an effort is made to find a member in the same State as that of the deceased member to take up the debentures. What is known as The Printing House was erected in the highest part of Glebe, near the University of Sydney, the foundation stone being laid on July 16, 1924, by Dr. W. N. Robertson, Chairman of Directors. Modern machinery and equipment were installed, a staff of skilled workers was engaged, and the journal of March 21, 1925, was the first to be produced in its entirety at the new building. A detailed description of the building as it was in 1925 and a fuller account of the development of the company than is here given will be found in the issue of April 11, 1925. In August, 1929, the positions of editor and manager were again made separate; and the present Manager, who had acted as assistant manager since February, 1928, was appointed Manager. The creation of this printing unit saw the fulfilment of the dreams of Henry William Armit; he died in March, 1930, with the knowledge that he had given to the medical profession of Australia the scientific printing press at which he aimed.

For some four to five years after 1925 the main consideration of the management was to consolidate the position both from a financial and trading point of view. This is usually a slow and delicate process in any new undertaking. Every contemplated move had to be carefully considered. The particular class of work sought and secured by the company soon demonstrated that special equipment should be purchased. In 1927 a monotype keyboard and type-casting machine were added to the plant. This enabled the company to set tabular matter and mathematical formulæ more expeditiously, and at the same time it assisted the linotypes with straight type-setting. A special room had to be built to house the casting machine. In the same year a further large press was purchased; this was a quad demy Miehle of English manufacture. In 1928 the large folding machine was found to be unsuitable for certain small work, and it was decided to purchase another but smaller machine. This was installed in July of that year, and it facilitated the handling of work which had previously been done by hand. Up to 1931 all work which required thread sewing was sent to various trade houses. This proved not only expensive but also unsatisfactory, owing to the necessary loss of control over any such work while not on the company's premises. An opportunity to secure a good

Type-setting department, showing monotype keyboard with operator.

Type-setting department, monotype casting room, showing two monotype casting machines and operators.

rebuilt sewing machine presented itself in November, 1931, and this machine was purchased and installed.

By 1932 the company was firmly established and working at the full capacity of the plant. In the following year it was decided to make the company more self-contained, and a binding machine was purchased. This made it possible to bind all work which had previously been done outside. The great increase in orders for professional stationery and small commercial work soon proved too much for the hand-fed platen, and a high-speed automatic Miehle was bought. This eased the position and enabled deliveries to be made in less time and at less cost.

By the end of 1934 the building had become too small for the installation of further plant, which was found to be necessary owing to the increase in work. The company was now in a sound position, and, as the future prospects appeared satisfactory, it was decided to extend the building. This was done, the work being completed in June, 1935. Modern offices were provided and additional room became available for extra machinery.

Printing department, Number 1 machine room, showing two heavy presses, small platen and staff.

As previously pointed out, one of the principal aims of the management was to make the company as self-contained and independent as possible. With this object in view it was decided to install another monotype casting machine. This made possible the making of type, spacing material and rules; it also provided a safeguard against mechanical breakdown of the existing machine.

From 1935 to the present the company has progressed further. Ample work has been available and, at short intervals, the necessary machinery to cope with the work has been purchased. In July, 1936, a new linotype machine was installed; in March, 1937, a medium high-speed press, and in September, 1937, a further high-speed automatic Miehle were added to the plant. Since then no machinery has been purchased, but much necessary equipment has been bought from time to time.

Printing department, Number 2 machine room, showing high-speed medium press and machinist.

Today all machines are working continuously, and there is every indication that it will not be long before further extensions to the building will be required and additional plant necessary. The property adjoining The Printing House was purchased during 1938, mainly as an insurance against possible opposition from the owners when extensions become essential.

A comparison of the number of the staff in 1925 and in 1939 is interesting. In 1925 it was twenty-five; today it is sixty-three, nine of whom are original members of the staff.

Almost without exception visitors to The Printing House have expressed regret that they had not allowed themselves more time in which to inspect the general processes of printing and to watch the operations of most interesting and intricate machinery. Within the building of the Australasian Medical Publishing Company, Limited, are some of the most modern machines designed for the purpose of printing.

The methods of making type, composing and printing, as recently as fifty years ago, were extremely crude when compared with the highly specialized methods employed today. The machines are the product of many years of research, and their operators must be skilled men of experience. It must not be thought, however, that all the various processes involved in producing a printed sheet have been mechanized; some of the work is still, and always will be, done by hand, and it is on these operations particularly that the success of the completed work depends.

The Australasian Medical Publishing Company, Limited, may be regarded as a self-contained printing house. Only raw materials, such as paper, ink and metal, are purchased; all processes, including the making of type, and excluding process engraving, stereotyping and electrotyping, are completed on the premises.

The visitor is always welcome, and any member of the British Medical Association sufficiently interested may spend a pleasant hour or so among the men and machines that make up our modern printing house. He will first be shown into the composing room. It is here that all type is set, either by hand or by machine, and worked upon by the compositors until it is ready for printing. Machine typesetting is done either on one of our four linotype machines or on the monotype and its two casters. When copy is received from an author (that is, copy not connected with THE MEDICAL JOURNAL OF AUSTRALIA) a decision has first to be made as to whether linotype or monotype setting is required. If the linotype is chosen, the copy is handed to the operator, who adjusts his machine for size of type and length of

line, and, after choosing the particular type required, he operates a keyboard similar to a typewriter. By the depression of certain keys brass matrices are made to assemble in proper order in a complete line. A metal cast is then automatically made, after which the matrices are returned by the machine to their original places in the magazine. This process is repeated until the setting is complete. The lines of metal type ("slugs") are placed on steel trays (galleys); a proof is then taken and passed to one of the two readers and his assistant for correction.

If the monotype is chosen, the process is entirely different. As mentioned above, the linotype casts a line of type in one solid "slug". The monotype caster produces type in similar lines, but with the important difference that each letter or character is a separate unit. The linotype is a self-contained unit of machinery; the monotype consists of a keyboard and one or more separate casting machines. By depressing certain keys the operator of a monotype keyboard causes the machine to punch holes in a roll of paper. These holes vary in position according to the character required. The completed roll, which is similar in many ways to an ordinary music roll, is then passed to the mechanic in charge of the caster. It is placed on the caster, and, by the ingenious use of compressed air, which is controlled by the perforations in the paper, a die case containing many separate characters is automatically brought into position over a metal mould and the required letter or figure is formed. As the type is made, it is automatically collected in lines of predetermined length on steel galleys. A proof is then taken by a compositor, who forwards it to the reader for checking with copy.

Printing department, Number 3 machine room, showing two small high-speed automatic machines and operators.

The monotype caster is also used for the purpose of casting large type in single characters. This type is used mainly for the composing of advertisements, book and magazine covers and for headings of articles.

Reference has already been made to the readers, whose duty it is to check all hand-set and machine-set type. They make sure that the author's copy has been faithfully followed and that the final proofs are free of errors. This work calls for attention to the smallest detail. It sometimes happens that mistakes in the author's work are found and corrected. A reader's position is most important, and, although the absence of machinery renders the reading department uninteresting from a visitor's point of view, the readers' work has largely contributed to the reputation of the company for accuracy.

Binding department, showing guillotine (left), two stitching machines (centre), one sewing machine (right) and staff.

Type-setting and reading finish the first stage of most work. The second stage is in the hands of the compositors, of whom there are eight and a foreman. The first duty of a compositor is to make any alterations and corrections which have been pointed out by our readers or by the author. He then arranges the type into sections, each section representing a page. This process is called "make-up", and the final appearance of the printed sheet depends to a large extent on the care and attention given to this work. The next stage is known as imposition. This consists of arranging in their proper order in steel frames (chases) the previously completed pages. A chase may contain four, eight, sixteen, thirty-two or even more pages, and is called a forme. This forme will ultimately be printed at one operation, and care must therefore be taken to insure that the position of the pages is such that when the printed sheet is folded each page will appear in its correct numerical order and, in addition, that the printing will appear perfectly square on each page and with uniform margins. When imposition is completed, a proof is taken and checked by a reader before the forme is sent to the machine room for printing.

The machine room of the Australasian Medical Publishing Company, Limited, consisting of three sections, is situated on the ground floor, which is of concrete construction and ideally situated for the erection and operation of large and heavy presses. These consist of two large, two medium, and two small automatic high-speed machines, as well as a small general purpose machine for the printing of letterheads, cards *et cetera*. The machine room staff comprises a foreman, six machinists and two apprentices. The visitor cannot help noticing the extreme care and attention which have been given to all previous processes of setting type, correcting and imposing it, and he will realize that in the process of printing equal care and attention must be given to every detail, as the work of the best of compositors can easily be rendered valueless if the machinists are not highly skilled and interested in their work. The machinists are, like all members of the other departments, specially chosen craftsmen. The first duty of a machinist is to adjust his machine for the size of sheet and class of paper to be printed, and then to prepare the impression cylinder for the type to be used. This consists of fastening to the cylinder a carefully prepared sheet of paper which has been made ready. The process of "make-ready" is made necessary by the

minute variations in the height of type. These variations must be adjusted before printing is begun. No doubt the reader has often seen printed matter in which the general effect is not uniform, some letters scarcely printing and others being almost punched through the paper. This is caused by bad "make-ready". Careful "make-ready" is necessary for the production of good printing. To "make ready" the machinist places the forme on his machine and takes an inked impression of the type on a clean sheet of paper; he then inspects the printed sheet and marks it in such a way as to distinguish the lightly printed from the more heavily printed parts; on the former pieces of tissue paper are pasted and from the latter the paper is cut away. It may take two or more hours to do this work thoroughly, as it is not always that the first sheet made ready proves satisfactory. The made-ready sheet is fastened to the cylinder of the machine and another impression taken. This process is repeated until the whole forme is evenly printed. The ink supply is then adjusted and actual printing commences. The output of the machines varies: on the larger presses nearly 2,000 impressions per hour may be obtained, while the small automatics are capable of up to 5,000 per hour. The printed sheets are delivered at the opposite end of the machine to that at which they enter. The sheets are automatically stacked ready for the binding department, the number printed having been recorded by a counter attached to the machine.

The binding department comprises a staff of seven girls and a forewoman. Their duties consist mainly in preparing the printed sheets for the cutting department. A printed sheet has first to be folded; this is done either by hand or, in the majority of cases, by one of the two automatic folding machines. Each printed sheet represents a complete section of a book or magazine. These sheets are placed at one end of a folding machine and are fed automatically into the folding rollers. Folded sheets are delivered at the rate of up to 3,000 sections per hour. These sections are arranged in proper order by the girls, and they are then either wire stitched or thread sewn together by machine. If the magazine requires a cover, this is now drawn on and the completed work is given to the cutter for trimming. Trimming is performed on a guillotine machine, which is capable of cutting in a single operation one edge of 100 or more copies of THE MEDICAL JOURNAL OF AUSTRALIA, three cuts being necessary to trim completely this number of copies. After trimming the books are ready for packing and dispatch.

This very brief and non-technical outline of the many and varied processes necessary for the production of a magazine can convey only in a limited way an impression of the work which is regularly in process at the premises of the Australasian Medical Publishing Company, Limited. The class of work undertaken comprises all kinds of printing, from an ordinary visiting card to the production of magazines and books. The latter frequently contain three- and four-colour illustrations. Colour printing has as a foundation the general principles of ordinary work, but, being much more difficult and complicated, calls for special skill and experience on the part of the machinist. The process is most interesting and its different stages of production have to be seen to be appreciated.

The managerial staff consists of eight persons, the Manager and his secretary, the Secretary of the Australasian Medical Publishing Company, Limited, together with five others, three seniors and two juniors. The editorial staff of THE MEDICAL JOURNAL OF AUSTRALIA consists of three persons, the Editor and two secretaries, a senior and a junior.

The foregoing description of the activities of the Australasian Medical Publishing Company, Limited, may give some indication of the progress which the company has made since its inception, and also serve to indicate the size and importance of an undertaking which is actually a possession of the medical profession in Australia.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on April 20, 1939, at the Royal Alexandra Hospital for Children, Sydney. The meeting took the form of a number of clinical demonstrations by members of the honorary staff of the hospital. Parts of this report appeared in the issues of June 10 and June 17, 1939.

Anal Abnormalities.

DR. F. C. ROGERS showed a girl, aged eight months, who had a small anal opening and an opening of the rectum into the vagina. The abdomen was distended. The vagina was dilated under a general anæsthetic and the anus was dilated and a rubber tube was inserted. The tube was removed and the dilatations were continued. The child was much improved.

Dr. Rogers also showed a male child who had been born with an imperforate anus. No vomiting had occurred after two days, but the baby was commencing to show signs of distress. He was well nourished and the abdomen was not distended. There was no anal opening, but an anal dimple was well developed and bulging occurred when the child cried.

At operation an incision was made through the anal dimple. A catheter was inserted and a bowel wash-out was given. Meconium was passed. The child continued to pass meconium and later fæces. At the time of the meeting the child was beginning to get control of the bowel.

Dr. Rogers next showed a boy, aged five days, a first child. Birth had been normal and forceps had been used. The child was born prematurely at eight months. He had been breast fed only once since birth. The child had been vomiting on and off since birth. The vomitus consisted chiefly of milk; no green fluid was present. The bowels had not been open since birth.

On examination the child appeared to be a normal baby. He continued to vomit, passing a few specks of meconium only. The abdomen became distended. *Per rectum*, the examining finger could be inserted only for 2·5 centimetres (one inch). The internal rectal sphincter was dilated digitally with difficulty, after which the child passed normal motions and ceased to vomit. The pelvi-rectal sphincter was dilated.

Synostosis of the Right Forearm.

DR. H. G. HUMPHRIES showed a female, aged two years, whose parents had noticed that the child was awkward at feeding herself with her right arm. Otherwise she was a perfectly normal child. Radiological examination revealed congenital synostosis of the upper ends of the radius and ulna.

Congenital Dislocation of the Hip.

Dr. Humphries's next patient was a girl, aged four years, who had first been admitted to hospital on August 10, 1937. An X ray examination at that time revealed congenital dislocation of the left hip joint. The left acetabulum was unusually poorly developed. The dislocation was reduced and a plaster splint was applied. The limb was kept in plaster for six months; then the child was allowed to get up and walk, and the hip appeared to be in good position.

The child was readmitted to hospital on August 3, 1938. The left greater trochanter was about one inch higher on the left side and the left leg was one inch shorter than the right. A shelf operation was performed on August 5, 1938, and a plaster spica was applied.

An X ray examination on September 6, 1938, revealed a good shelf, united in position. The head lay in a good position beneath the new formation. The child was given reeducation and movements and was able to walk well.

DR. W. VICKERS showed a girl, aged three years, who had had a waddling gait for twelve months. Radiological examination revealed bilateral congenital dislocation of both hip joints. The acetabula were large and shallow.

The limbs were placed in extension and nine pounds' weight was applied on both sides from above the knees for one month. Then manipulation of both hips was performed and a double hip spica was applied. Radiological examination then revealed that both femoral heads were in good relation to their respective acetabula.

Dr. Vickers also showed a boy, aged two and a half years, whose parents had noticed one year earlier that the child walked peculiarly—"spread his legs out when walking". Radiological examination revealed bilateral congenital dislocation of the hips.

Osteomyelitis.

DR. H. G. HUMPHRIES showed a boy, aged two and a half years, who had been admitted to hospital with a history of lameness of the right leg on and off for six weeks. The right knee had been swollen and painful for two days. There was nothing else of note in the previous history.

The radiologist reported that there was an area of necrosis in the posterior aspect of the lower end of the diaphysis of the right femur. The appearances suggested localized low-grade osteomyelitis with a sequestrum.

Operation was performed. A lateral incision was made over the popliteal space and the lower end of the femur was exposed. No sequestrum was found, but a necrotic cavity was curetted. The wound was closed. An X ray examination on April 12, 1939, revealed slightly increased erosion, but no great change.

Another patient shown by Dr. Humphries was a girl, aged four years, who had had osteomyelitis of the left femur two years earlier and had undergone two operations. At the time of the meeting there was a swelling round the lower wound.

On examination two scars were seen on the anterior aspect of the left thigh. There was one scar on the postero-lateral aspect of the thigh, with some swelling at the lower end. The radiologist reported that there were a few very small flakes on the medial aspect of the shaft, which probably represented small sequestra.

Dr. Humphries also showed a girl, aged six years, who had been admitted to hospital with a history of pain in the left thigh of four weeks' duration. One month previous to this she had had sores on her hands, legs and arms.

On examination the patient was a pale child, lying on the left side. She appeared ill. Her left hip was abducted and the knee was flexed. All movements were limited. The circumference of the left thigh was 7·5 centimetres (three inches) more than that of the right thigh.

Radiological examination revealed osteomyelitis of the upper two-thirds or three-quarters of the left femoral diaphysis. No definite involvement of the right hip was apparent.

Operation was performed. An incision was made on the anterior aspect of the left hip joint. Pus was evacuated, from which *Staphylococcus aureus* was grown in culture. A blood transfusion was given. The last radiological examination before the meeting revealed faintly visible periostitis in the lower end of the shaft. A cortical sequestrum was on the medial side of the shaft, 150 centimetres (six inches) below the head.

Dr. Humphries finally showed a boy, aged twelve years, who had had pain in the left thigh for six days prior to his admission to hospital. He had been unable to walk for five days. He had had a small pimple on the leg. There was no history of injury.

On examination the left thigh was tender at the junction of the upper and middle thirds. An incision was made over the lateral aspect of the upper third of the left femur. The bone was drilled and pus was found in the shaft. A rubber drain was inserted into the wound. *Staphylococcus aureus* was grown in cultures from the blood and from the pus from the wound. The radiologist reported the presence of osteomyelitis of the whole of the femoral diaphysis.

Congenital Nasal Obstruction.

DR. HUFF JOHNSTON showed a female infant, aged three weeks, who had been admitted to hospital on December 19, 1938, with a history of nasal discharge since birth and of inability to breathe through the nose. No cough was present. A pronounced nasal discharge and an eczematous rash were evident. There was no reaction to the Wassermann test, and radiological examination revealed no abnormality.

Operation was performed on February 10, 1939, and a septum was found extending across the naso-pharynx at the level of the bony palate. A hole was bored in the septum on each side, about one-quarter of an inch in diameter, and each nostril was packed with "Vaseline" gauze. At the time of the meeting the patient was able to breathe much better and was gradually putting on weight.

Methods of Fluid Replacement in Pædiatric Practice.

A practical demonstration of methods of fluid replacement in pædiatric practice was given by DR. LORIMER DODS and DR. T. Y. NELSON. By means of diagrams it was shown that approximately 70% of an infant's weight was represented by fluids, and that the extracellular fluids, such as blood, lymph, cerebro-spinal fluid and interstitial fluids, constituted approximately 25% of the infant's body weight, the remainder of the fluid being intracellular. It was emphasized that any serious diminution in the amount of the extracellular fluids must threaten the life of body cells, although the intracellular fluids were rarely disturbed until the actual approach of death. Attention was drawn to the fact that the sick child usually received unknown and often inadequate amounts of fluid and that specific instructions about his fluid intake were an essential part of his treatment. It was pointed out that the normal infant required a fluid intake of 75 to 90 cubic centimetres (two and a half to three ounces) per pound of body weight per day, and that the dehydrated infant might require for rehydration as much as 105 or even 115 cubic centimetres (three and a half or four ounces) per pound. It was emphasized that any suggestion of a negative fluid balance should prompt the administration of extra fluids; this should be commenced before the classical signs of dehydration appeared.

The various routes, solutions and methods of fluid administration were outlined and were illustrated by practical demonstrations. In the case of fluid administration *per rectum* the following amounts were recommended: from birth to eighteen months, 15 to 60 cubic centimetres (half an ounce to two ounces); eighteen months to five years, about 60 cubic centimetres (two ounces); five to twelve years, 115 cubic centimetres (four ounces) or more.

Attention was drawn to the failure of the child's rectum to retain repeated infusions, if these were continued for more than twenty-four hours, and to the fact that glucose was probably not absorbed from the rectum except in very small amounts. It was stated that the amount of fluid which might be given by the intraperitoneal route during the first year of life might be reckoned as ten to twenty cubic centimetres per pound of body weight; that this amount might be given every six hours if necessary; and that glucose was not absorbed by this route. It was suggested that the subcutaneous route was unsatisfactory and that the anterior fontanelle should not be used for infusions except in exceptional circumstances.

The methods of single and continuous intravenous infusion were discussed in detail and were illustrated by practical demonstrations, which included details of technique and the recording of a "fluid balance" sheet, an essential feature of continuous intravenous infusion. Attention was drawn to the fact that Ian Wood and other Melbourne workers were responsible for the promotion of the technique of continuous intravenous fluid therapy in Australia and that today readily available sterile solutions, such as "Soluvac" preparations, had made this form of therapy feasible in general practice.

Deformities of the Hand.

DR. J. STEIGRAD showed four patients with deformities of the hands, three of whom had been subjected to operation. Two had suffered from congenital webbing of the fingers, and satisfactory results had been gained by the use of the Agnew operation. Dr. Steigrad said that in this operation a triangular flap of skin and subjacent fat were raised on the dorsum of the deformity, with the base at the metacarpo-phalangeal joints and the apex on the web at the level of the first interphalangeal joints. After division of the web this flap was drawn through and the apex was sutured to the palm. Remaining raw areas were closed over either by undercutting and approximation of the edges or by the use of thin Thiersch grafts. It was wise to delay the operation until the patient was at least three years of age, and it was important to use a dorsal tin splint with the fingers extended and spread out fan-wise. Educative movements should be commenced early and should be continued for some months after the operation. The two other hand deformities were contractures following burns, and demonstrated the unfortunate results obtained when splinting was not used in the healing stage of burns. In one of these cases the fingers had united and the tips had grown onto the palm of the hand. A complete reconstruction of the hand and fingers had been required, and this had been done by means of an abdominal pedicle graft with double attachment. Several other plastic operations had been performed on this child's hand and the child was still under treatment. The fourth child has not yet been operated on, but excision of the scar and the application of razor grafts were proposed. The continued use of a dorsal hand splint and reeducation were essential in the treatment of these contracture deformities.

Cerebro-Cranial Injuries.

Dr. Steigrad also showed four patients who had suffered severe cerebro-cranial injuries requiring operation. The first, a boy, aged seven years, had fallen from his tricycle and sustained a ruptured middle meningeal artery. The picture he had presented was typical; there had been delay of three hours before he became unconscious, and the unconsciousness had deepened. The pulse rate had gradually fallen and there had been slight one-sided weakness and typical pupil signs. At operation an enormous clot, extradural in position, was found, covering the entire hemisphere over the frontal, parietal, temporal and occipital regions. This was sucked out and hæmostasis was secured by silk suture. For four days after operation the child's progress was very disturbed, with periods of stupor and coma. These, however, were satisfactorily controlled by the use of dehydration and lumbar puncture. The boy's condition at the time of the meeting was quite normal; but it was considered that a bone graft might be necessary at a later stage to fill in the large skull defect. Dr. Steigrad pointed out that extradural hæmorrhage as a result of tearing of the middle meningeal artery was rare in children.

Another patient, a girl, aged four and a half years, had been hit on the head by a cricket ball and had been admitted to hospital in a very drowsy and irritable state with a simple depressed fracture over the occiput. Operation revealed a large stellate fracture with a very deep saucer-shaped depression in the bone. This had only just missed the sinus. The depression was elevated and the condition healed in ten days. There had been no fits and the girl was perfectly normal.

The next patient, a girl, aged five years, had been knocked over by a push bicycle, and some object, possibly the handle of the bicycle, had punctured the skull. She had been admitted to hospital, unconscious, with a large cerebral hernia, the size of a walnut, over the parietal area. At operation infected brain and skin had been removed and loose bone fragments had been cleared from inside the cerebrum. The depression was raised and the skin was sutured. For a few days there was a mild one-sided paresis, but this disappeared and the child had been discharged after six weeks. This had occurred three years earlier. She had suffered three minor fits within three months of the operation, but had been perfectly well since.

Another patient, a boy, aged six years, had been knocked over by a motor car and admitted to hospital in an unconscious state. He had had a compound comminuted depressed fracture of the right parietal bone. Under local anæsthesia the depression was elevated, fragments of bone were removed from under the *dura mater*, and the skin had been excised and the wound closed. Healing had occurred in ten days and the child was perfectly well; but consideration would be given at a later stage to a bone graft to fill in the skull defect.

Dr. Steigrad considered that these four patients demonstrated the satisfactory results obtainable in children after severe cerebro-cranial injuries. Healing was quick and there was no pronounced tendency to the development of post-traumatic effects.

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held at the Children's Hospital, Carlton, Melbourne, on April 12, 1939, DR. D. O. BROWN, the President, in the chair. The meeting took the form of a series of clinical demonstrations by members of the society.

Tuberculous Bronchopneumonia in Infancy.

DR. ROBERT SOUTHBY showed a male baby, aged ten months, who had been admitted to the hospital at the age of five and a half months with tuberculosis. The baby was born one month prematurely, and weighed 2·3 kilograms (five and a quarter pounds) at birth. The baby was breast fed for two months, and three weeks later the mother died of pulmonary tuberculosis. On admission to hospital it was found that the baby's temperature varied between 37·3° and 38·4° C. (99° and 101° F.), and that all over the chest the percussion note was impaired and scattered rhonchi were audible with harsh breath sounds. A positive reaction to the Mantoux test was obtained with a dilution of one in one hundred parts, though no reaction occurred with a one in one thousand dilution. Though no tubercle bacilli were found in laryngeal smears and samples of sputum, a culture of the organisms was obtained from the proceeds of gastric lavage. It was shown in a series of skiagrams that in the early stages the appearances of generalized tuberculosis of the lungs were evident, but that the condition had become localized to several areas of bronchopneumonic consolidation. In spite of occasional setbacks, the baby had gained steadily in weight; and though there had been considerable difficulty in breathing and intercostal retraction, those features had become much less definite. The temperature had continued to fluctuate during the day, and the baby had had many profuse sweats. The weight had increased to 6·8 kilograms (15 pounds).

Dr. Southby said that at first he had suspected the presence of pertussis because of the association of coughing and vomiting; but the investigation had established the diagnosis of tuberculosis and the course of the disease had not resembled that of pertussis. When the baby had been

in hospital for two and a half months the haemoglobin value was only 40% and the erythrocyte count was correspondingly low. At that stage a transfusion of 170 cubic centimetres (six ounces) of blood had altered the clinical picture, and the baby had continued to progress and to gain weight. The physical signs had become localized chiefly to the middle lobe of the right lung, though elsewhere there were scattered signs. Dr. Southby said that he had had to review the diagnosis of generalized miliary tuberculosis, and he showed the baby as an interesting example of one who had survived the severe infection from the age of five months to that of ten and a half months; the patient seemed to have weathered the storm, but the prognosis was still uncertain. Dr. Reginald Webster had made the suggestion that the condition was persistent non-tuberculous bronchopneumonia; but he had grown *Bacillus tuberculosis* in culture from the gastric washings. It was unusual for such a baby to survive for so long, and the circumstances of the recovery of the organisms were noteworthy. The case emphasized the risk run when a mother with an open tuberculous lesion was allowed to nurse her baby at the breast.

DR. KEITH HALLAM referred to an article published some twelve years earlier in an American journal, in which it had been stated that an analysis of one hundred autopsy reports on infants found to have died of acute or subacute pulmonary diseases had shown that approximately half the diagnoses had been made on clinical grounds and half of them on radiological appearances. It was concluded from the article that such conditions could not be diagnosed accurately by either method alone. Dr. Hallam also commented on epituberculous or anaphylactic phenomena seen in some of the films; he thought that it was a favourable feature in the case of the infant shown by Dr. Southby that some reaction had occurred, and indeed it was sufficient to lead them to hope that the baby would have time to overcome the infection.

DR. W. McL. SMITHERS reminded members that a case of recovery from chronic miliary tuberculosis had been described recently in *The British Medical Journal*.

Dr. Southby, in reply, said that in his opinion epituberculosis resembled unresolved lobar pneumonia gradually resolving over a period, perhaps of years; but that the lesion of the baby he had shown was clinically bronchopneumonia which had been regarded originally as a miliary sowing, and *Bacillus tuberculosis* had been recovered from the patient.

Gargoylism.

Dr. Southby and Dr. Smithers showed a female child, aged five years, who presented the whole combination of features understood by the term "gargoylism". Dr. Southby said that he had seen the child from birth and had shown her at a clinical meeting in 1937 in Melbourne; at this meeting Dr. Robert Hutchison, of London, had been present and had evinced great interest in the child's condition. Dr. Southby had also shown an older brother, then aged three years, at a meeting of the Melbourne Paediatric Society.

The little girl was born in December, 1933; delivery was easy and non-instrumental, and the condition of bilateral *talipes calcaneus* was congenital. The baby had been breast fed and had suckled well; at five weeks the knees and elbows had been spastic, but the legs had improved by the age of five months. He had seen the child professionally when she was seven months of age because of the presence of profuse coryza with purulent nasal discharge; at that time she could hold up her head, but was unable to sit unsupported. At the age of nine months the coryza was still troublesome; the nostrils were large and the lips thickened; the navel was prominent, and the circumference of the head was 45 centimetres (eighteen inches). He went on to say that when the child was aged one year the curious greyish coloration of the eyes, suggesting cloudiness of the cornea, had been noticed. Her back was still weak and she was unable to sit up; she had a definite dorsilumbar kyphosis. The spleen was palpable and the liver was enlarged. At the age of twenty-one months she was a replica of what her brother had been at the age of two years; the head circumference was 50 centimetres (twenty inches). At two years and one month she was not able to walk or indeed support herself, could only mutter monosyllables and appeared to be deaf.

Dr. Southby summarized the condition by saying that the child was backward physically and mentally; she had profuse nasal discharge from her enlarged nostrils, her cornea were greyish and clouded, and their appearance varied from time to time; she was unable to sit up, and kyphosis was apparent; the skull was characteristically enlarged and there were characteristic changes in the limbs; and umbilical and inguinal hernia were present. There had been only the two children in the family, and the brother had died in 1937. Dr. Southby had reached the conclusion that the condition was a clinical entity to as great an extent as were such conditions as mongolism, cretinism or achondroplasia; but he had not been able to give it a name until Dr. Smithers had recognized it as an example of gargoylism.

Dr. Smithers gave an account of the history of gargoylism, ascribing the original description to Hurler in 1919. Jewesbury and Spence had drawn particular attention to the acrocephaly in 1921. Heimholz and Harrington, in 1931, had emphasized the ocular clouding, and Sheldon, in 1934, the gigantism with hepatomegaly and splenomegaly. Ellis Sheldon and Capon, in 1936, had reviewed the literature and suggested the title "gargoylism" for the syndrome. Dr. Smithers added that the condition was familial, but not hereditary; of seventeen cases he had discovered in the literature nine patients were siblings.

The pathology of the condition was as yet unknown. A lipoid dystrophy had been suggested, but had not yet been confirmed. It had been suggested by Dr. Colin Macdonald that the enlargement of the *sella turcica* was secondary to the hydrocephalus and was not an index of pituitary disturbance. Hypothyreoidism was unlikely to be a factor, for no patient had been reported as having improved with thyreoid substitution therapy. The Wassermann test regularly elicited no reaction, and the blood chemistry was normal. The condition appeared to be a dystrophy involving the three cell layers.

DR. H. DOUGLAS STEPHENS admitted that he had had no previous knowledge of the condition until he had seen the brother of the child shown that night at a clinical meeting. He commented on the features of resemblance to acromegaly, myxœdema and hydrocephalus and the absence of relation with Morquio's syndrome, a condition associated with dwarfism. On clinical grounds he did not think that the hips were dislocated; Shenton's line might be distorted in odd cases in which the heads of the bones were in the socket; the radiographic appearances were suggestive of pre-subluxation.

DR. J. B. COLQUHOUN said that certain features of the case interested him, such as the skeletal changes in a child whose spine and limbs had never borne weight. The child might have some curious muscular dysfunction which prevented her from holding the spine properly. He could recall three children, in particular, who were unable to walk and had pelves radiographically resembling that of the child shown at the meeting in certain respects, such as the lengthening of the neck and the presence of *coxa valga*; but he did not think that the hips were dislocated.

DR. COLIN MACDONALD, who expressed the opinion that the radiological appearances were those of dislocation of the hips, produced an authoritative book and read an extract to substantiate that opinion; he laid down the criteria by which radiologists could interpret the appearances in the films.

DR. ERIC PRICE observed that owing to the presence of gargoylism it might not be possible to form a judgement on the radiographic appearances in the case under discussion on the basis of criteria found on normal skeletal structures.

Dr. Southby gave an outline of the history of the patient's brother, and stated that the serum of each member of the family had failed to react to the Wassermann test.

Pneumonectomy for Congenital Pulmonary Cyst.

DR. H. L. STOKES showed a girl, aged ten years, upon whom Dr. C. J. O. Brown had performed pneumonectomy at the Alfred Hospital. Dr. Stokes said that he had shown the girl previously at a meeting before the operation. At that time she had had a non-productive cough for three months and the physical signs of right-sided pneumothorax with displacement of the heart to the left. The clinical signs and the radiographic appearances supported the diagnosis of congenital cystic disease of the lung. It had been regarded as likely that operative treatment would be necessary; but it had remained an open question as to when the operation would be indicated. The twin sister of the patient had had an incision made over the posterior portion of the right side of the chest for the removal of a nævus; but the skiagrams of her chest revealed no abnormality. A series of skiagrams had been taken, over a period of several months, from which it was demonstrable that the cystic area was slowly and quietly increasing. The mother and the children had then disappeared into the country, and Dr. Stokes had heard no more of them until Dr. Brown had seen them again at the Alfred Hospital and had mentioned the fact to him. As it was found that further displacement of the heart had occurred, and that the cystic portion of the lung had increased in size, he had agreed that the time had arrived for operation. At the operation, in January, 1939, the right-sided cystic area was found to be under positive pressure, and when lipiodol was introduced the multilocularity of the cyst was apparent. Spinal anæsthesia was used, and a large cyst was found; when air was removed, the cyst could not be removed with the lobe, so Dr. Brown had decided that pneumonectomy rather than lobectomy was necessary. Dr. Stokes was able to show the specimen of the lung removed at the operation, which had three distinct lobes and the large cyst below them. It had been dissected by Dr. Willis as far as the hilus; the cyst was growing from a small portion of the lowest lobe and histologically was lined with columnar cells and some ciliar cells in places. The child had made an excellent recovery, and though fluid had drained from the wound for some weeks, less than one ounce had been withdrawn by aspiration ten days before the meeting. The liver was rising satisfactorily and the thoracic cage was sinking in. The child was able to run about freely and was very well. Dr. Stokes added that he wished at a later date to carry out an estimation of the vital capacity of the child and, by way of comparison, of her twin sister. He concluded his demonstration with a series of lantern slides.

DR. RUSSELL HOWARD raised the question as to the necessity for pneumonectomy rather than lobectomy in the case under consideration. He quoted two instances of encysted empyemata which he considered comparable with that under discussion, and said that in each instance lobectomy had been performed with success. He considered that lobectomy might have been attempted after marsupialization to allow of contraction to a sinus tract, with resultant conservation of lung tissue. He congratulated Dr. Stokes and Dr. C. J. O. Brown on what he described as a good case from which to demonstrate that pneumonectomy was practicable as a form of treatment. As the patient was young and the cyst was uninfected and not malignant, the circumstances had been ideal.

Dr. Stokes pointed out that the operation had not been carried out for the acquisition of an interesting specimen; the indications for it were a slow increase in intracystic pressure, pushing the heart over, and the additional ever-present risk of infection of the cyst. He said that he would continue to keep the child under observation. He had in his clinic two children, each of whom had only one lung.

Free Tendon Transplant.

DR. ERIC PRICE showed a male patient, aged twelve years, to illustrate the use of a free tendon transplant. The boy had injured his right ankle with an axe three years earlier, and the wound had been sutured at once; but the right foot had become increasingly valgous. When the child was seen by Dr. Price on January 15, 1939, the foot was extremely flat, chiefly because the right *tibialis posterior* tendon was not functioning. Dr. Price decided to attempt repair, and on February 7 the operation was performed. When opened, the sheath of the *tibialis posterior* tendon was empty; at its insertion 1·9 centimetres (three-quarters of an inch) of tendon was found, but the proximal end had retracted about 10 centimetres (four inches) and terminated in attenuated fashion. He had taken a graft from the *peroneus longus* tendon of the same foot, exposed the tendon at two points, divided it at those points and drawn out about 15 centimetres (six inches) of tendon. The remainder of the *peroneus longus* muscle was sutured to the adjacent *peroneus brevis* at the two points, one at the level of the cuboid and the other where the tendon became definite in the leg. The free transplant was then transferred to the medial side of the foot and sutured with fine silk to bridge the gap in the *tibialis posterior* tendon, and the tendon sheath and laciniate ligament were reconstituted with catgut. A plaster splint had been applied to hold the foot in a strongly inverted position, and two weeks later the plaster was split into two sections to allow of the performance of gradually increasing exercises. Eighteen days after the operation definite contraction of the tendon had been palpable and the power had steadily increased, until at the time of the meeting the tendon would support the weight of the foot with additional moderate resistance. The patient had not been allowed to bear weight, and it was anticipated with confidence that further power would return to the muscles.

Dr. Price commented that if loss of substance followed a tendon injury the deficiency should be overcome by some form of graft. Three types of graft were available: (i) tendon lengthening of some type, which really amounted to pedicle grafting; (ii) free transplant of some available tendon; and (iii) suture to an adjacent intact tendon. He stated that the use of free transplants had been strongly advocated by Stirling Bunnell, of San Francisco, who on occasions preferred that procedure to primary suture and had reported excellent results, especially on the hand. Dr. Price had used free transplant of the *palmaris longus* tendon in a case in which the flexors of the index finger had been destroyed by sepsis; but the operation had been a complete failure. He realized that in the present case the tendon had not yet recovered sufficient power for function, and might not do so; but it did demonstrate the viability of a free tendon graft and the possibility of a successful result, especially where great strength was not necessary.

Dr. Colquhoun congratulated Dr. Price on the excellent result of an operation which was by no means easy to carry out; he had obtained a tendon capable of being trained, and it would be of great interest to see the patient again in about a year's time.

DR. W. KENT HUGHES wondered why it was necessary to interfere with the *peroneus longus* tendon, which he regarded as the most important tendon of the foot. He added that he had used silk insertions in the early years of the present century, and believed that a thick piece of braided silk might do as well as a free tendon transplant.

Dr. Price said that the interesting point was consideration of the problem as to whether the muscle would ever become sufficiently hypertrophied to be useful. He had taken the *peroneus longus* tendon because it was conveniently situated; he did not think that it was as important as Dr. Kent Hughes had stated, and he knew that Dr. C. W. B. Littlejohn was in the habit of incising several inches of *peroneus longus* tendon in the treatment of spastic flat feet. He also expressed the hope that the peroneal function would not be lost, as the *peroneus brevis* tendon was doing duty for both muscles. He had required a good strong tendon, and the foot on which he was operating was already prejudiced by several years of disability.

Pathological Exhibits.

Tubercle Bacillus Culture from Gastric Lavage.

DR. REGINALD WEBSTER showed a culture of the human type of *Bacillus tuberculosis* which he had secured from

the product of gastric lavage in the case of the infant presented by Dr. Southby. He said that forty years had elapsed since Meunier, in 1898, first recommended lavage of the stomach of children during fasting and a search for tubercle bacilli in the deposit obtained by centrifugation of the washings. Until 1927 no extended use was made of the method; but in that year Armand-Delille and Vibert reported their results of the examination of 110 children, in 31% of whom they demonstrated tubercle bacilli by Meunier's technique. These workers relied on microscopic search alone; and some criticism of their results on that ground was perhaps valid, as the non-pathogenic acid-fast bacilli of milk and butter were not thereby excluded. More convincing were the results of the three Danish workers, Poulsen, Jensen and Husted, who had supplemented microscopic search by cultural methods and guinea-pig inoculation. They had thus demonstrated tubercle bacilli in the gastric washings of eleven out of fifteen children affected with the juvenile or "primary infection" type of pulmonary tuberculosis.

Dr. Webster said that such findings in infants and young children with "hilus tuberculosis" were disconcerting, in that they suggested that no form of tuberculous pulmonary lesion could safely be regarded as closed; they also furnished evidence that infants with pulmonary tuberculosis were infective and indicated the necessity for their isolation.

Tuberculous Tarsus.

Dr. Webster next discussed a specimen in which a tuberculous focus was seen in the talus. The child had formerly been treated at the Children's Hospital Orthopædic Section, Frankston, with apparent success. A few weeks earlier Dr. D. O. Brown had demonstrated to Dr. Webster what seemed to be a perfect cure of the bony disease in the foot. The child was then very active and was not in the least troubled by her foot, which could be manipulated in all directions without any distress to her. He understood that radiological examination supported the conclusion reached on clinical grounds that the outcome was entirely favourable. Dr. Webster said that a few days after the occasion on which Dr. Brown had shown him the clinical result the little girl became ill, and before long, unfortunately, the diagnosis of tuberculous meningitis was established. The portion of the foot showing the excavating lesion in the talus, with adjacent bones, had been secured *post mortem*. From this focus, which as far as clinical judgement could determine was satisfactorily healed, he had cultivated the tubercle bacillus by utilizing material which he had scraped from it at the autopsy. That was another disconcerting finding.

Tuberculous Bacilluria.

Dr. Webster then said that he wished to draw the attention of those present to the case of a boy, aged eleven years, who had appeared at the out-patient clinic of Dr. J. B. Colquhoun for the first time on November 18, 1938. It was then stated that he had passed blood at the end of micturition during the preceding four days. The boy was asked to pass urine, and the appearance of blood in the last few cubic centimetres confirmed the history given. A skiagram showed a shadow of doubtful origin opposite the body of the third lumbar vertebra. A note was entered on the boy's card on December 12, 1938, that he had had no pain and had passed no more blood. This note was repeated on December 30, after which the boy ceased to attend. In the meantime a specimen of urine had been sent to the pathological laboratory; Dr. Webster had examined it prior to preparing cultures, but had been unable to find any red blood cells or pus cells. Eventually he obtained a culture of the tubercle bacillus, which was well established and of macroscopic dimensions on February 27, 1939. He later learned that the boy's father had died of pulmonary tuberculosis and that a sister suffered from tuberculosis of the spine.

Dr. Webster said that in view of the occurrence of hæmaturia he did not anticipate that anyone would question the existence of a tuberculous renal lesion in this boy; but the particular specimen from which he had cultivated the tubercle bacillus showed no microscopic evidence of such a lesion. In his opinion, tuberculous bacilluria was inseparable from renal lesions, possibly minute, but always present when tubercle bacilli were being discharged in the urine. He regarded "elimination" or "excretory" bacilluria as an altogether untenable conception.

Inguinal Gland Biopsy in the Diagnosis of Tuberculous Disease of the Knee Joint.

Dr. Webster showed lantern slides prepared from photomicrographs of a section of an inguinal gland, which established the diagnosis of tuberculous disease of the knee joint. This procedure had been brought to his notice by Dr. D. O. Brown, who, while on a visit to England in 1938, had learned of its value from Dr. H. J. Seddon, of the Royal National Orthopædic Hospital. A child at the Orthopædic Section, Frankston, in whom tuberculosis of the knee joint had been suspected for some months, but never established, provided an opportunity for exploration of the possibilities of inguinal lymph gland biopsy in diagnosis. Dr. Brown therefore excised a gland, in the microscopical sections of which, as were seen from the photomicrographs, the histological reaction characteristic of tuberculosis was unmistakable.

In the case of a second child, under the care of Dr. H. Douglas Stephens, the same result had been obtained by histological methods applied to one-half of the excised gland, and Dr. Webster had demonstrated tubercle bacilli in a young culture from the other half. Dr. Stephens's patient had exhibited a slight limp and complained of joint pain at intervals for a period of three months; but clinical and radiological signs were minimal.

Dr. Webster said that a paper by H. J. Seddon on inguinal lymph gland biopsy in the diagnosis of tuberculous disease of the knee joint had appeared in *The British Medical Journal* of January 21, 1939. From the fact that Seddon had detected tuberculosis in the inguinal lymph glands of fifteen out of eighteen children chosen on clinical and radiological grounds as subject of knee-joint tuberculosis, it seemed very probable that a subclinical tuberculous inguinal adenitis was a constant concomitant of tuberculosis of the knee. He understood that palpable enlargement of the external iliac glands had long been recognized, particularly in France, as a feature of tuberculous disease of the hip joint. H. J. Seddon gave credit to José Valls, of Buenos Aires, for pioneer work on this subject, although at the time he commenced his own work that of Valls was unknown to him. Valls obtained 15 positive results out of 17 biopsies, and his examinations were not confined to the inguinal glands and the knee joint. Valls described instances of tuberculosis of the elbow and wrist joints with positive findings in the epitrochlear gland. Seddon histologically demonstrated tuberculosis in the inguinal glands of a patient affected with a tuberculous ankle joint, and in another patient with a tuberculous hip he obtained a similar finding in an external iliac gland.

Dr. Webster said that time would not permit him to discuss the subject further. The article by H. J. Seddon was easily accessible to any who desired fuller information. In the only two inguinal glands which he had so far been asked to examine for evidence of tuberculosis as a means of establishing the diagnosis in suspected tuberculosis of the knee joint, the histology was indubitable and had been endorsed by cultivation of the tubercle bacillus from the second gland.

Dr. Webster said that very interesting problems arose from this procedure, and in conclusion he would submit three questions: (i) Was it perhaps not correct, as the older anatomists had always maintained, that there were no lymphatic vessels in the bone marrow? (ii) Why did not suppurative inguinal adenitis sometimes complicate the pyarthrosis of the knee joint which so commonly accompanied osteomyelitis of the distal end of the femur? (iii) Why did the tuberculous inguinal adenitis now shown to be associated with tuberculous disease of the knee joint never advance beyond the subclinical stage?

Post-Graduate Work.

WEEK-END COURSE IN SURGERY.

THE New South Wales Post-Graduate Committee in Medicine has arranged to hold a course of instruction in surgery at the Prince Henry Hospital, Little Bay, during the week-end August 5 and 6, 1939. The programme is as follows:

Saturday, August 5.

9.30 a.m.—Clinico-pathological demonstration: tumours of the breast, the Director of Post-Graduate Surgery, Dr. H. R. G. Poate.

10.30 a.m.—"Internal Derangements of the Knee Joint", Dr. R. V. Graham.

11 a.m.—Morning tea.

11.15 a.m.—"Deep X Ray in the Treatment of Carcinoma", Dr. R. A. Gardner.

12 noon.—"Acute Intestinal Obstruction", Dr. T. M. Furber.

1 p.m.—Luncheon.

2 p.m.—"The Role of Surgery in the Treatment of Peptic Ulcer", Dr. Rutherford Darling.

3 p.m.—"Gall-Stones and their Complications", Dr. Howard Bullock.

4 p.m.—Afternoon tea.

4.15 p.m.—Ward rounds.

5 p.m.—"Prostatic Obstruction: The Diagnosis and Management" and cinematograph film demonstration, "The Harris Operation of Suprapubic Prostatectomy with Closure", Dr. R. Harris.

Sunday, August 6.

9.30 a.m.—"Carcinoma of the Stomach", The Director of Post-Graduate Surgery, Dr. H. R. G. Poate.

10.30 a.m.—"Methods in Transfusing Citrated Blood", Dr. E. B. Jones.

11 a.m.—Morning tea.

11.15 a.m.—"Œsophageal Obstruction", Dr. Huff Johnston.

12 noon.—"When to Operate in Appendicitis", Dr. J. Colvin Storey.

The fee for this course will be one guinea. Applications for registration, which must be accompanied by a remittance for the amount of the fee, must be made to the Secretary, New South Wales Post-Graduate Committee in Medicine, the Prince Henry Hospital, Little Bay.

Correspondence.

WORKERS' COMPENSATION PRACTICE.

SIR: I feel constrained to write, as I am disappointed that there have not been other letters in support of Dr. Davey's in the issue of May 27.

If the medical practitioner of this State takes the trouble, the Minister for Social Services, Mr. Richardson, will not be long in securing evidence when an employee has been inveigled, intimidated or coerced by an employer or an insurance company into seeking attention away from his own doctor-elect.

It amazes me that many an ordinarily intelligent and informed employee is still unaware that he can, under the act, have free choice of his doctor. If such rights were filched from him in other avenues, howls of indignation and protest would be set in operation by his union, with, probably, a sit-down strike as a consequence.

The employee is mostly satisfied with the treatment he receives at the hands of insurance companies, as they are well equipped and usually supply efficient medical service, and it is only when his just claims for compensation are imperilled that he senses the necessity or value of his own medical attendant. The whole fabric of the worker's standing and morale is encroached upon, and, if ignorance of his just rights persists and no one else takes the trouble to enlighten him, the sooner we post notices in our waiting rooms and surgeries, the better.

Further, if premiums are based on the present erroneous assumption that the worker can and will exercise untrammelled his choice of doctor, then surely the time is long past when they should have been revised.

Yours, etc.,

W. J. McCRISTAL.

"Mentone",
147, Anzac Parade,
Kensington.
June 6, 1939.

HISSING SIBILANTS.

SIR: Like Dr. Hamilton, and no doubt many another, I too have always been impressed by the writing on the wall of the theatre in Royal Prince Alfred Hospital. Its noble and high ideals are beyond praise, but I have ever been disturbed by the succession of harsh, hissing sibilants which fall so ungratefully on the listening ear. This unpleasant feature of spoken English is almost impossible to avoid. Nevertheless, a mild protest may be raised about the sequence in the first line. Would it have not been better rendered: "Be silent, be serious, be observant." I think this diction is more euphonious. The last line should read: "Respect the art that saves and heals."

Yours, etc.,

RAYMOND HENNESSY.

55, Collins Street,
Melbourne, C.1,
June 6, 1939.

THE MANAGEMENT OF INOPERABLE MALIGNANT DISEASE IN GENERAL PRACTICE.

SIR: In reading Dr. Hamilton's excellent article in your issue of June 3 I was particularly interested in the hopeless attitude he takes to cancer of the œsophagus. I feel that his attitude and the suggestion of Souttar's tubes will raise a storm of comment from the deep X ray therapists. For this field is the area of one of the greatest advances in treatment in recent years; so much so that many clinics are showing cases in which the primary growth of the œsophagus is effectively "sterilized" and the patients have died from secondary involvement. In Edinburgh the response to treatment is such that they believe that no case needs gastrostomy or Souttar's tubes. Even inpenetrable carcinomata have melted in two weeks to such an extent that swallowing sufficient food is possible. If we have not already X ray tubes of similar strength to those overseas, it is time we had them and realized their capabilities.

Yours, etc.,

N. F. BABBAGE,
M.B., B.S. (Syd.), F.R.C.S. (Edin.).

Roseville,
New South Wales,
June 7, 1939.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Mankin, Winifred R., M.B., B.S., 1939 (Univ. Sydney), Royal Alexandra Hospital for Children, Camperdown.

O'Halloran, Max Anthony, M.B., B.S., 1938 (Univ. Sydney), c.o. Dr. U. L. Bourke, Merewether, Newcastle.

The undermentioned have applied for election as members of the South Australian Branch of the British Medical Association:

Plummer, Rex Grosse, M.B., B.S., 1937 (Univ. Adelaide), Strathalbyn.

Bishopverder, Ernest, German Licence, Berlin, 1928, M.B., L.R.C.P. and S. (Edinburgh), L.R.F.P.S. (Glasgow), 1938, Hawker.

Diary for the Month.

JULY 6.—South Australian Branch, B.M.A.: Council.
JULY 27.—South Australian Branch, B.M.A.: Branch.
JUNE 28.—Victorian Branch, B.M.A.: Council.
JUNE 29.—New South Wales Branch, B.M.A.: Branch.
JULY 4.—New South Wales Branch, B.M.A.: Council (quarterly).
JULY 5.—Victorian Branch, B.M.A.: Branch.
JULY 5.—Western Australian Branch, B.M.A.: Council.
JULY 6.—South Australian Branch, B.M.A.: Council.
JULY 7.—Queensland Branch, B.M.A.: Branch.
JULY 11.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
JULY 14.—Queensland Branch, B.M.A.: Council.
JULY 18.—New South Wales Branch, B.M.A.: Ethics Committee.
JULY 19.—Western Australian Branch, B.M.A.: Branch.
JULY 20.—New South Wales Branch, B.M.A.: Clinical Meeting.
JULY 25.—New South Wales Branch, B.M.A.: Medical Politics Committee.
JULY 26.—Victorian Branch, B.M.A.; Council.
JULY 27.—New South Wales Branch, B.M.A.: Branch.
JULY 27.—South Australian Branch, B.M.A.: Branch.
JULY 28.—Queensland Branch, B.M.A.: Council.
AUG. 1.—New South Wales Branch, B.M.A.: Organization and Science Committee.
AUG. 2.—Victorian Branch, B.M.A.: Branch.
AUG. 2.—Western Australian Branch, B.M.A.: Council.

Medical Appointments.

Dr. G. McL. Turnbull has been appointed Surgical Registrar at the Adelaide Hospital, Adelaide, South Australia.

* * *

Dr. A. A. Sharland has been appointed a Government Medical Officer in accordance with the provisions of the *Mine Workers' Relief Act*, 1932, of Western Australia.

* * *

Dr. L. A. A. Forbes has been appointed Government Medical Officer at Tweed Heads, New South Wales.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages XXX-XXXIII.

DEPARTMENT OF PUBLIC HEALTH, PERTH, WESTERN AUSTRALIA: Resident Medical Officer.

DEVON PUBLIC HOSPITAL, LATROBE, TASMANIA: Surgeon Superintendent.

INNISFAIL HOSPITALS BOARD, INNISFAIL, NORTH QUEENSLAND: Assistant Medical Officer.

THE UNIVERSITY OF SYDNEY, NEW SOUTH WALES: Lecturer in Pathology, Director of Pathological Unit.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 178, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
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